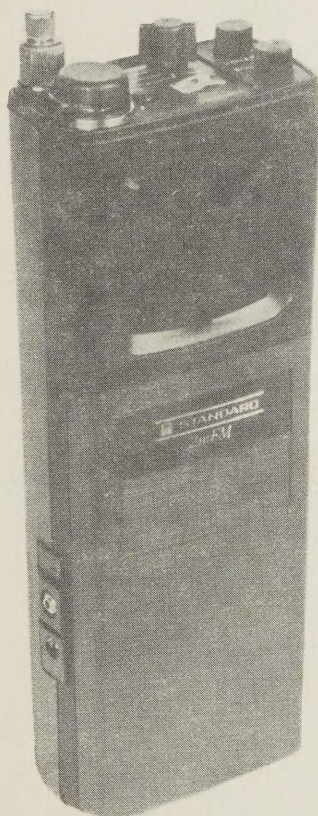


C146A

PRELIMINARY INSTRUCTION MANUAL



VHF/FM
AMATEUR
HANDHELD
TRANSCEIVER



Standard Communications Corp.

Limited Warranty

STANDARD COMMUNICATIONS CORP. (SCC) warrants each new radio product manufactured and/or supplied by it to be free from defects in material or workmanship under conditions of normal use and service. The SCC obligation under this warranty is limited to repairing or replacing, at its option, the radio product or part(s) therein, which upon examination by SCC are found to be defective or not up to the factory specifications, and contingent upon return of the radio product (transportation prepaid) to an authorized SCC FACTORY SERVICE CENTER.

SCC shall not be liable for any damages, consequential or otherwise, resulting from the use or operation of this radio product and makes no other warranty(s) either expressed or implied on this product, including any warranty of merchantability.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring (not our own), improper installation, or to use in violation of instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory or authorized service center, not to cases where the equipment serial number has been removed, defaced, or changed, nor to accessories used therewith not of our own manufacture.

STANDARD COMMUNICATIONS CORP.

CUSTOMER RECORD

Purchase Date (Warranty Effectivity Date) _____

Purchase From _____

Equipment Model No. _____

Equipment Serial No. _____

Warranty Serial No. _____

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GENERAL INFORMATION

INSPECTION OF EQUIPMENT

Your STANDARD COMMUNICATIONS 146A amateur handheld transceiver has been thoroughly tested prior to shipment and was delivered to the transportation company securely packed. Upon acceptance, they assumed responsibility for its safe arrival.

If possible, the equipment and its accessories should be unpacked and examined immediately upon receipt for any damage (or shortage) that may have occurred in transit. Any damage (or shortage) should be noted on the freight bill or delivery receipt and countersigned by the transportation company agent (the truck driver can act as agent). Where the equipment cannot be unpacked upon receipt, and subsequent damage (or shortage) is discovered, keep all packing materials and request the transportation company to inspect the shipment and give you a signed inspection report stating the condition. This must be done within 15 days of delivery.

Failure to observe these procedures will make it difficult, or impossible, to establish the transportation company's liability for claim purposes.

SERVICE

Your STANDARD COMMUNICATIONS 146A amateur handheld transceiver is warranted against defects for 180 days. The warranty card must be filled out and signed by the dealer at the time of purchase and returned within 10 days for the warranty to be in effect. If your set is out of warranty, or if you elect to have repairs made in the field (not covered by factory warranty) rather than returning it to the factory, contact your STANDARD COMMUNICATIONS dealer who will recommend a qualified repair facility to do the work.

DESCRIPTION

The STANDARD COMMUNICATIONS CORP. Model 146A VHF/FM Amateur Handheld Transceiver provides up to five channel operation within a 2 MHz portion of the 143 to 149 MHz frequency range. However, should operation be desired on frequencies outside of this bandwidth (i. e., for "MARS" operation) it may be possible without retuning, although a drop in sensitivity and/or output may occur. The Model 146A is completely solid-state and is designed to operate from a 12-volt DC power source (nominally an internal rechargeable 12-volt Ni-Cad battery) with an RF power output of two watts. Provision is included to install the optional TN3 Private Channel for activation of continuous tone coded squelched systems (CTCSS).

SPECIFICATIONS

All performance specifications are nominal unless otherwise specified.

General

FREQUENCY RANGE:	143 to 149 MHz
NUMBER OF CHANNELS:	5
CHANNEL SPREAD:	2 MHz Max.
INPUT VOLTAGE (NEGATIVE GROUND):	12.5V DC \pm 20%
CIRCUITY:	All solid state
CURRENT DRAIN:	15ma squelched max., 100ma receive max., 0.62A transmit max.
MICROPHONE:	Internal dynamic type
DIMENSIONS:	9"h x 3"w x 1 5/8"d
WEIGHT:	32 oz. max. (including batteries)
SUPPLIED WITH 2 CHANNELS:	146.94Tx/Rx (national calling channel) 146.34Tx/146.94 Rx (repeater channel)
SPEAKER:	Internal 2" dynamic

Transmitter

POWER OUTPUT (INTO 50 OHMS):	2 Watts
SPURIOUS AND HARMONICS ATTENUATION:	50 dB Min.
HUM AND NOISE LEVEL ATTENUATION:	40 dB Min.
AUDIO RESPONSE:	Meets EIA specifications
AUDIO DISTORTION:	6% Max.
FREQUENCY STABILITY:	0.001% (-10° to + 50°C)
MODULATION:	16F3 \pm 5 KHz

Receiver

SENSITIVITY (20 dB QUIETING):	0.4uV
SQUELCH SENSITIVITY (THRESHOLD):	0.2uV
SQUELCH TYPE:	Carrier
MODULATION ACCEPTANCE BANDWIDTH:	\pm 8 KHz Min.
SELECTIVITY (20dB QUIETING 30 KHz Ch):	60 dB Min.
SPURIOUS AND IMAGE ATTENUATION:	55 dB Min.
AUDIO POWER OUTPUT:	0.3 Watts at 10% max. dist.
AUDIO RESPONSE:	Meets EIA specifications
FREQUENCY STABILITY:	0.001% (-10° to +50°C)
INTERMODULATION SPURIOUS ATTENUATION:	40 dB Min.

Optional TN-9 Private Channel

TONE DEVIATION:	700 Hz Min (using 77 Hz reed)
TONE SENSITIVITY:	-3 dB Max. (using 77 Hz reed, 300 Hz deviation)

ACCESSORIES

The following optional accessories for your C146A Transceiver are available at all SCC Dealers.

AT12 ✓	ANTENNA, flexible steel whip for VHF application.
AT19 ✓	ANTENNA, flexible rubber for VHF application.
AT21	ANTENNA, VHF/UHF, with gutter clip for mobile installation. Includes 8' cable with connector.
USA-2 ✓	BATTERY CHARGER, desk type, provides two charge rates and includes provision for base station antenna connection. Operates on 120 VAC/60 cycle power.
12/120-6	BATTERY CHARGER, wall mounted. Operates on 120 VAC/60 cycle power.
B0903002	BATTERY, NI-CAD, "AA" size cell, 1.2 volts, rechargeable. (Ten required per transceiver.)
BP-2 ✓ CMP 42	BATTERY PACK, NI-CAD 12 VDC, completely encapsulated (One required per transceiver). HORIZON 2 EXTERNAL MIKE

NOTE

See your SCC Dealer for Rapid Charge and Alkaline Battery Packs with the new "Drop-In" feature.

UAD	CABLE ADAPTOR, adapts external antenna to H/H transceiver.
CMA	POWER ADAPTOR, adapts the H/H transceiver to mobile application using external power and antenna inputs.
A00416008	KIT, Microphone Clip Kit contains hardware to mount external mike on LCC-2 carrying case.
PT3644	CARRYING CASE, leather.
LCC-2 & 3 ✓	CARRYING CASE, leather, heavy-duty.
MP08	MICROPHONE, miniature external with coiled extension cord.
MP10	MICROPHONE/SPEAKER, external with coiled extension cord.
PE-1	TWO-TONE PAGING ENCODER.
TN-5	TONE BURST ENCODER.
TN-9	PRIVATE CHANNEL TONE BOARD, CTCSS encoder/decoder.
TN50	TWO-TONE SQUELCH DECODER.
TT-1	TOUCH TONE ENCODER.

AMATEUR FM COMMUNICATIONS

With your purchase of the all new 146A two meter FM transceiver, you have just entered the fascinating world of amateur FM - the Fun Mode.

If you have not experienced FM operation before, you will encounter a unique mode of amateur radio communications. If you are familiar with conventional high-frequency SSB or CW operation, you will have to re-orient yourself to FM.

Generally, your dealer or local FM'ers will know what the popular frequencies are in your area. One of the popular national simplex frequencies is 146.940 MHz ("nine-four"), unless there is a repeater output on this frequency in your area. The most popular national repeater channel is 146.340 transmit/146.940 receive. Both 146.94 simplex and the 34/94 repeater pair are included in your 146A. Other popular repeater pairs include:

146.16 transmit/146.76 receive

146.28 transmit/146.88 receive

In addition, we recommend that you install 146.520 MHz simplex, as it is the up-and-coming alternate national calling frequency.

Then, before you go "on-the-air", LISTEN TO THE CHANNELS IN USE FIRST to determine the accepted operating procedures on the frequency, or repeater, you plan to use.

Procedures - although very simple - vary from area to area. FM is a "break-in/break-out" operation with SHORT transmissions. Since the channels are shared by many people, this is very important. Many repeaters limit your transmission through the use of a "Time-Out" timer. These timers vary in length - generally 1 to 3 minutes.

It is not necessary, nor desirable, to call "CQ" as you would on other bands, since FM is channelized, and thus all those on a given channel are monitoring simultaneously. A simple "WA6XYZ 10-8" or "This is WA6XYZ on channel" will elicit a response from anyone who desires to talk. Some areas use the "10" codes or "Q" signals; however, you will find that if you talk as you would in a normal conversation, you will soon adapt to the free-and-easy manner of FM - the Fun Mode.

Repeaters are sponsored by either an individual or a club. Where an individual is responsible, it is generally advisable to obtain permission before using the system. A great number of repeaters today are sponsored by radio clubs or associations. Since repeaters are costly to build and require maintenance, many clubs require membership or support for their project. Since this responsibility is spread over many users, the individual user cost is negligible. Visit your local club, and you will find those with a similar interest eager to help.

We hope that this gets you off on the right foot. If you have any questions, just drop a note to: Standard Communications Corp., Attention: Amateur Radio Division, P. O. BOX 92151, Los Angeles, California, 90009.

OPERATION

GENERAL

All controls (except the Push-to-Talk button) are located on the top of the case. These consist of the Channel (CH), Volume/Off (VOL/OFF) control, and the Squelch/PC (SQL) control.

If the optional TN3 Private Channel board has been installed in your 146A, the effect will be to provide automatic continuous squelch until a signal containing a specific sub-audible tone is received. Thus, only transmissions from those within your system who also have the Private Channel (with the same tone-coding) will activate your receiver. When transmitting, the specific sub-audible tone is generated by the Private Channel circuit and supplied to the transmitted carrier as modulation, so that only the desired receiver(s) will be activated.

OPERATING PROCEDURES

Handheld Operation - Place the 146A transceiver in operation as follows:

- (1) Extend the collapsible whip antenna, or install a SCC P/N AT12 or AT19 flexible whip antenna.

NOTE:

To install the AT12 or AT19 antennas, unscrew and remove the collapsible whip and install the appropriate flexible antenna in its place.

- (2) Rotate the VOL/OFF control clockwise until a "click" is heard.
- (3) Rotate the SQL control full counter-clockwise, but not to the point where a "click" is heard.
- (4) Adjust the VOL control for the desired listening level (background noise, or a station if one is transmitting).
- (5) Set the CH switch to the desired channel.
- (6) If Private Channel operation is desired (TN3 installed), rotate the SQL control fully counter-clockwise until a "click" is heard: For normal operation (or if no TN3 board is installed), adjust the SQL control clockwise until the background noise just disappears.

NOTE:

Do not adjust the SQL control past the point of receiver silencing or the sensitivity will be degraded for weak signals.

- (7) When ready to transmit, press the push-to-talk button and hold it. Speak slowly and clearly in a normal conversational level into the speaker grill: Release the button to listen.

FUNCTIONS OF 146A CONTROLS AND CONNECTIONS

- (1) Volume/Off Control (VOL/OFF) - Applies power to set when rotated clockwise past OFF position; adjusts audio output level.
- (2) Squelch Control (SQL) - Adjusts threshold point for "noise actuated" squelch circuit.
- (3) Panel Meter - Indicates battery voltage in the "transmit" mode, and relative signal strength in the "receive" mode.
- (4) Antenna Receptacle (ANT) - Provides connection to auxillary antenna.
- (5) Push-To-Talk Switch (on side) - Switch unit to "transmit" mode when depressed.
- (6) Battery Charger Contacts (on bottom) - Provide connection of charging contacts when unit is placed into handheld charger (Model SR-CSA or SC-UHHC-1).
- (7) Auxillary Power Input Receptacle (PWR) - Allows connection of power source (12.5 volt) other than internal battery or handheld charger. Circuitry allows charging of internal batteries.
- (8) Earplug Receptacle (EAR) - For semi-private conversations, or listening ease in noisy environments.
- (9) Microphone Receptacle - Allows separate microphone to be utilized for ease when unit is worn on side or placed in handheld charger.
- (10) Collapsible Antenna - Removable for utilization of other special purpose antennas.
- (11) Channel Selector Switch - Selects desired operating channel.



Figure 1: C146A CONTROLS AND CONNECTIONS

- (8) If using the optional MP08 hand microphone (or MP10 speaker/microphone), remove the protective cap on the top of the case and install the microphone: Transmit as in step (7), but use the push-to-talk button on the microphone instead.

Base Operation - For base operation with the Model SA Desk Top Charger/AC Adapter, install the transceiver in the charger until it bottoms and connect to an appropriate AC power source: Install the interconnecting cable to the ANT receptacle on the 146A and connect the 50-ohm transmission line to the UHF connector on the Model SA. Operate in accordance with steps (2) thru (8) of "Handheld Operation".

Mobile Operation - For mobile operation with the Model MA Mobile Adapter, connect the power cable from the adapter to the PWR receptacle on the side of the case and connect the antenna cable to the ANT receptacle on the top: Connect the 50-ohm antenna transmission line to the UHF connector on the Model MA.

CAUTION:

IF OPERATING MOBILE WITHOUT THE MODEL MA MOBILE ADAPTER, INSERT A SUFFICIENT NUMBER OF POWER DIODES (1 AMP RATING) IN SERIES WITH THE POWER INPUT TO REDUCE THE DC INPUT TO THE 146A TO 15V DC WHEN THE ALTERNATOR/GENERATOR IS DEVELOPING MAXIMUM VOLTAGE. ALSO, INSERT A SCC P/N LF06 LINE FILTER (OR EQUIVALENT) IN SERIES WITH THE POWER INPUT TO REDUCE ALTERNATOR "WHINE".

BATTERY REPLACEMENT AND CHARGING

GENERAL - The Model 146A is designed to operate from an internal 12-volt battery source. The recommended power source is 10 "AA" size 1.2-volt rechargeable Ni-Cad batteries (SCC P/N B0903002). However, the transceiver may also be operated with 8 non-rechargeable "AA" size batteries if desired (Alkaline type preferable for longer service). Remove the battery pack from the transceiver if it is to be stored for a prolonged period.

BATTERY REPLACEMENT - To install batteries in the 146A, proceed as follows (refer to Fig. 2):

- (1) Press down on the indentation (OPEN) on the rear of the case and slide the battery compartment cover downward in the direction of the arrow: Remove the cover.
- (2) Lift out the battery pack and disconnect the cable from the transceiver.
- (3) Install the new batteries in the battery pack, observing the polarity markings.

NOTE:

When operating with 1.5-volt batteries the two dummy batteries (SCC P/N 3653121112) must be installed in the battery pack to complete the circuit.

- (4) Reconnect the cable to the transceiver and replace the battery pack: Replace the battery compartment cover and latch in place.

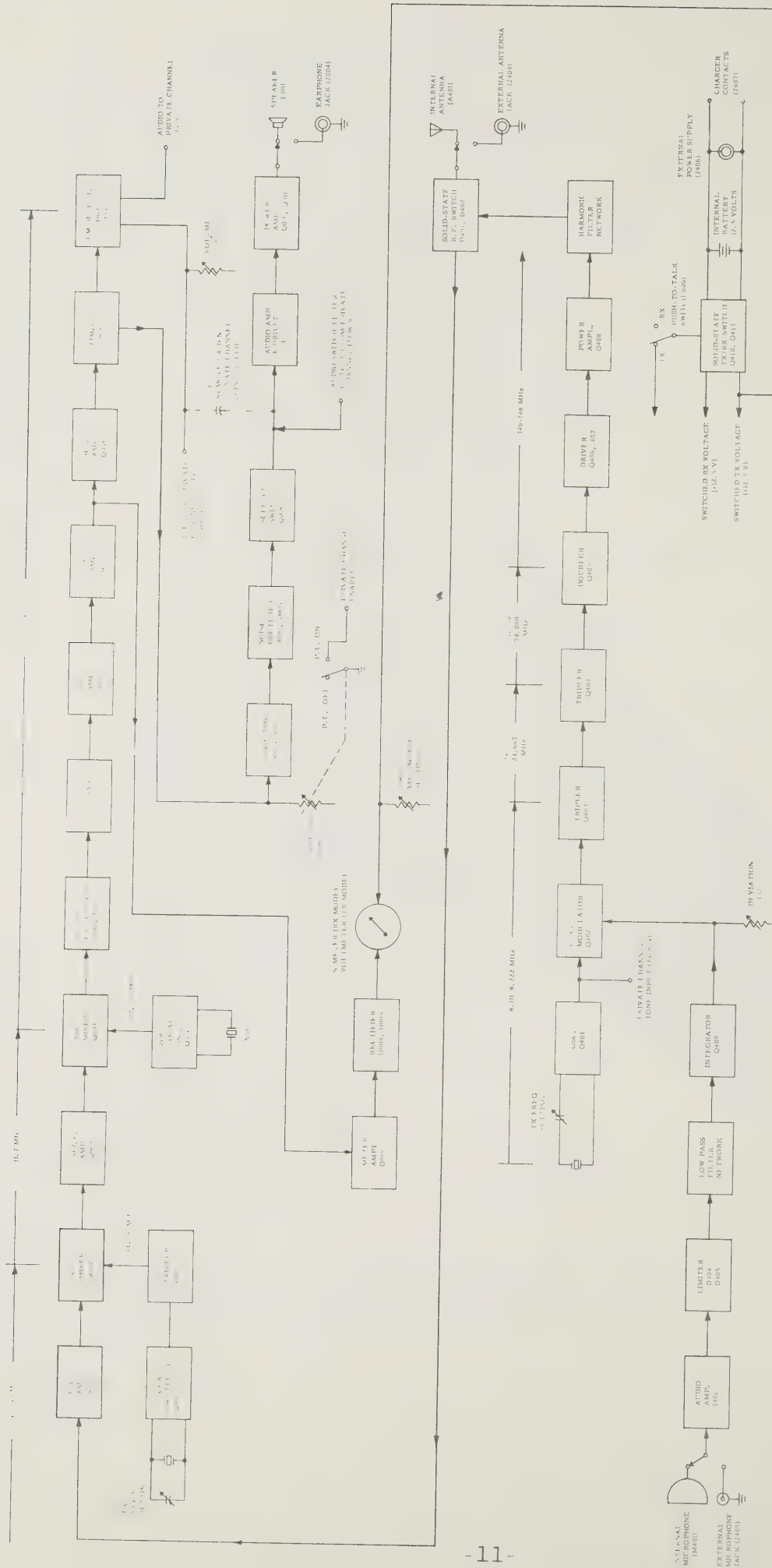
BATTERY CHARGING - The operational characteristics of a Ni-Cad battery under load are different than those of a conventional Alkaline or lead-acid type. The load voltage will be approximately the same until the battery approached complete discharge. At this time, there will be a marked decrease in the load voltage and the discharged condition will be reached abruptly. Therefore, it is difficult to determine the state of charge of a Ni-Cad battery with a voltmeter.

The battery may be stored in any condition of charge or discharge. No detrimental effects will occur. However, for storage periods in excess of six months or so, it is recommended that the battery be in a discharged condition.

If the battery is to be used after a prolonged storage period it should be initially charged for 14 to 16 hours at the full charging rate, then placed on trickle charge until need for use.



Figure 2: REMOVAL OF BATTERY COVER



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C146A BLOCK DIAGRAM

THEORY OF OPERATION

TRANSMITTER

Refer to the Block Diagram and Schematic Diagram for the following description.

The oscillator, Q401, is crystal controlled and generates the initial RF signal in the frequency range of 8.111 to 8.222 MHz. The RF signal is then applied to the phase modulator, Q402, together with the audio modulating signal. The audio signal varies the internal and input capacitance of Q402, in turn causing the RF signal to be phase shifted at the audio rate.

The angular phase shift produced by Q402 without distortion is relatively small. Therefore, the oscillator frequency is multiplied 18 times to obtain the desired deviation at the output frequency of 140 to 148 MHz.

Two tripler stages, Q403 and Q404, and one doubler, Q405, provide the necessary 18 times frequency multiplication. The drivers, Q406 and Q407, then amplify the 146 to 148 MHz signal prior to application to the RF power amplifier. The RF power amplifier, Q408, develops the output signal applied to a tri-filar wound broadband output circuit and a two-section pi-network. The pi-network matches the output impedance of Q408 to the 50-ohm antenna, through diode D401. The diode is forward biased in the "transmit" mode, functioning as a solid-state antenna relay.

The transmitter contains an instantaneous deviation control (IDC) circuit to prevent a higher than normal output level from the microphone from causing overdeviation in the output signal.

Under normal conditions, the speech signal from the built-in microphone is amplified by integrated circuit 1401 and a 6 dB/octave pre-emphasis is applied. The pre-emphasized signal is then applied through a peak limiter, D404, and D405, and low-pass filter to the integrator, Q409. At normal, or lower microphone output levels, the audio signal is not limited, and Q409 applies a 6 dB/octave de-emphasis to offset the pre-emphasis from the speech amplifier.

This results in a "flat" output in the audio signal applied to the phase modulator, Q402. The phase modulator in turn has an inherent 6 dB/octave pre-emphasis characteristic, resulting in a 6 dB/octave pre-emphasized output modulation from the transmitter.

When the microphone output level increases to a point where overdeviation could occur the positive and negative peaks of the waveform are clipped in the limiter, D404 and D405. This produces an essentially square wave constant amplitude output, removing the 6 dB/octave pre-emphasis applied to the signal in the amplifier. The limited signal is applied through the low-pass filter, which reshapes the audio waveform to the integrator. The integrator applies the 6 dB/octave de-emphasis which then offsets the inherent 6 dB/octave pre-emphasis of the phase modulator. This results in a transmitter output frequency deviation that is essentially flat over the range of modulating frequencies.

RECEIVER

The 146 to 148 MHz input signal is obtained at the junction of L414 and C443 in the transmitter, through C444. In the "transmit" mode D402 conducts to protect the receiver input from overload. The input signal is amplified by a MOSFET RF stage, Q001, and applied to the first mixer, Q002. The MOSFET RF stage minimizes spurious and intermodulation responses.

The input signal is heterodyned with the output of the first local oscillator by Q002 and converted to the first IF, 11.7 MHz. The first local oscillator injection frequency is 11.7 MHz below the input signal frequency in all cases. The fundamental crystal frequency, however, is multiplied nine times to reach the injection frequency. The actual crystal operating frequency is in the 15 MHz range, and is determined from the equation:

$$f_c = \frac{f_i - 11.7}{9}$$

where: f_c = fundamental crystal frequency in MHz
 f_i = receiver input signal frequency in MHz

The first local oscillator circuit consists of the crystal oscillator/tripler, Q012, and a second tripler stage, Q013. The resulting 11.7 MHz signal from Q002 is then amplified by Q003 and applied to the second mixer, Q004, where it is heterodyned with the 12.155 MHz output of the second local oscillator, Q014, and converted to the second IF, 455 kHz.

NOTE:

If interference is noted from stations operating 910 kHz above the input signal frequency, the second local oscillator crystal frequency can be changed to 11.245 MHz. This means the second IF image 1.82 MHz lower in frequency. To obtain the proper crystal, order SCC P/N XA1211245.

Two cascaded ceramic filters, F001 and F002, provide the selectivity for the 455 kHz IF, and the signal is amplified by four cascade stages, Q005 thru Q008, and applied to the limiter, Q009, and FM detector, D001 and D002. The limiter removes any vestige of amplitude modulation from the signal, while the FM detector functions to produce an audio output in response to the corresponding frequency (or phase) shift in the 455 kHz IF signal. The detector output is then applied to the integrated circuit audio amplifier, I001. The output of I001 is then applied to the built-in speaker, and the EAR and external MIC receptacles.

A "noise-actuated" squelch circuit is included to "quiet" the receiver when no carrier is present. This is accomplished by applying the collector detected AM (noise) signal from Q009 through two stages of noise amplification, Q016 and Q017, and detecting the noise component with D006 and D007. This produces a DC voltage that controls the squelch amplifier, Q018, which in turn produces a DC voltage that cuts off the audio amplifier, I001, until a signal overcomes the "noise" and "opens" the audio channel.

METER CIRCUIT

The relative received signal strength is indicated on the panel meter, M001, by sampling the 455 kHz signal at the output of Q007. This signal is amplified by Q015 and detected by D004 and D005. In the "transmit" mode M001 indicates the battery voltage.

POWER SWITCHING CIRCUIT

The +12V DC input power is filtered and applied through the switch (located on the VOL control) to the input buss. Diode D003 is connected across the power input to shunt the input voltage to ground if the power source (battery or external source) is connected with polarity reversed. Diode D010 prevents the battery from discharging back into the charger if it is shut off while the transceiver is still installed.

The +12V DC on the input buss is applied to two switching transistors, Q410 and Q411. The switching transistors function as series pass elements, with Q410 applying operating voltage to the receiver circuitry, and Q411 applying operating voltage to the transmitter circuitry.

PRIVATE CHANNEL

The optional TN3 Private Channel provides a tone-coded squelch function when connected to J408 in the transceiver. A DC switch "mutes" the receiver audio amplifier until a signal is received containing the specific sub-audible tone of the resonant reed in the TN3. This tone causes the DC switch to open, thus activating the audio amplifier. The same circuit is used to generate the sub-audible tone when transmitting. Placing the transceiver in the "transmit" mode applies the sub-audible tone as modulation on the transmitted carrier, to activate the desired receiver(s).

MAINTENANCE

GENERAL

The inherent life of solid-state components used in the 146A will allow many years of continuous use without failure, provided the equipment is treated with reasonable care. Other than the routine maintenance procedures and precautions described in this section, it is not recommended that alignment and/or adjustments be performed unless degraded performance characteristics are noted.

The transceiver has been carefully aligned at the factory, using specialized test equipment that is not normally available to the average amateur owner. Therefore, in the event difficulty occurs, and your unit is out of warranty, or if you elect to have repairs made in the field (not covered by factory warranty) rather than returning it to the factory, a qualified service facility with the proper test instrumentation and technical capabilities should be engaged. An authorized STANDARD COMMUNICATIONS service dealer, or the factory should perform any service work if possible.

PRECAUTIONS

Certain precautions should be observed to prevent damage to the transceiver. The following abnormal conditions should be avoided to realize the maximum inherent life capabilities.

Transmitter Load - Never intentionally "key" the transmitter unless an antenna or suitable dummy load is connected to the ANT receptacle. Failure to observe this precaution may result in serious damage to the RF power amplifier transistors.

Proper Supply Voltage - Avoid excessive supply voltage when operating from an external source (see CAUTION following mobile operation). The maximum DC voltage should not exceed 15V DC for any appreciable period, nor should the unit be operated when the supply voltage drops below 11V DC. Check your voltage with the engine running fast enough for the ammeter to indicate "charge", and with the transmitter "keyed" to provide maximum load.

Exposure to Water - Avoid direct exposure to water. If the unit is accidentally subjected to heavy splash or immersion, permanent damage may be avoided by opening the case and drying in direct sunlight, or the warmth of a heated room. A drying period of 4 hours should be sufficient.

If exposure was to salt water, carefully flush with clean, fresh water before drying, then inspect for signs of salt deposits.

CAUTION:

AVOID WATER CONTACT WITH THE INTERNAL LOUDSPEAKER;
THE CONE WILL BE PERMANENTLY DAMAGED.

ROUTINE MAINTENANCE

The exterior of the transceiver should be cleaned periodically to preserve its appearance. Use a cloth moistened with water and household detergent, finishing with an overall wipe with a cloth moistened with alcohol. If the unit has been used in a dusty environment, the interior should be cleaned with a low-pressure air hose, or vacuum cleaner. Excessive dirt or other soil should be removed from the interior with a soft brush and alcohol. Be sure and dry thoroughly before operating.

ROUTINE PERFORMANCE CHECKS

The transmitter RF output, and receiver 20 dB quieting and squelch sensitivities should be checked periodically to assure proper operation. These may be checked as follows:

NOTE:

Performance checks should be made with a fully charged set of batteries installed, or with an external source of 13.8V DC (under load).

Transmitter - Connect a suitable RF power meter/dummy load to the ANT receptacle and "key" the transmitter for each position of the Channel Selector switch. The power meter should indicate a minimum of 2 watts out on each channel.

Receiver - The receiver 20 dB quieting and squelch sensitivity measurements require use of an accurately calibrated FM signal generator covering the 143 to 149 MHz range, and an AC VTVM. These measurements should be made for all channels.

The 20 dB quieting sensitivity is measured by connecting the VTVM at the external SPK receptacle and noting the "noise voltage" output on the VTVM (no signal input and the SQL control adjusted for maximum noise). The unmodulated signal generator output is then applied at the ANT receptacle, set for the proper input frequency, and the output amplitude adjusted until the "noise voltage" on the VTVM drops to 1/10 of the previous reading (20 dB decrease). The signal generator output amplitude is then the 20 dB quieting sensitivity: The signal generator output should be 0.4 uV maximum.

The squelch sensitivity is measured by adjusting the SQL control (with no signal input) until the speaker "noise" just cuts out (squelch threshold), then applying signal and adjusting the signal generator output amplitude until speaker "noise" is heard. The signal generator output amplitude should be 0.2 uV maximum.

TROUBLESHOOTING

Conventional signal tracing techniques can be utilized to locate a fault within the 146A. The first step is to isolate the fault to a particular circuit within the transmitter or receiver. An oscilloscope provides the simplest method of such signal tracing, as a circuit malfunction will be immediately apparent.

Once the malfunction has been isolated to a particular circuit, voltage and resistance measurements may be used to isolate a defective component. Reference to the schematic diagram will assist in this operation. The diagram shows the circuit on the circuit board, together with the associated peripheral components (controls, crystals, etc.) required to illustrate the complete signal path through the circuit. Appropriate voltage measurements are also shown on the diagram to aid in locating a malfunctioning circuit or component.

ADJUSTMENTS AND ALIGNMENT

All adjustments and alignment procedures are conducted at 12.5 volts DC input power (under load) unless otherwise directed.

RECOMMENDED TEST EQUIPMENT AND TOOLS

- (a) FM Communications Monitor - Cushman Electronics Model CE-3.
- (b) FM signal generator - Motorola Model T1035A.
- (c) Frequency counter - General Radio Model 1192-B.
- (d) RF wattmeter/50-ohm dummy load (5 watts minimum) - Motorola Model 6154.
- (e) VTVM-Hewlett-Packard Model 427A with 11096A probe.
- (f) VOM - Simpson Model 260.
- (g) Slug adjustment tool - SCC P/N AT-1.
- (h) Slug adjustment tool - SCC P/N AT-3.
- (i) Trimmer adjustment tool - SCC P/N AT-2.
- (j) Plastic tweezer - SCC P/N PT-1.
- (k) Antenna Adapter - SCC P/N SR-CAD.

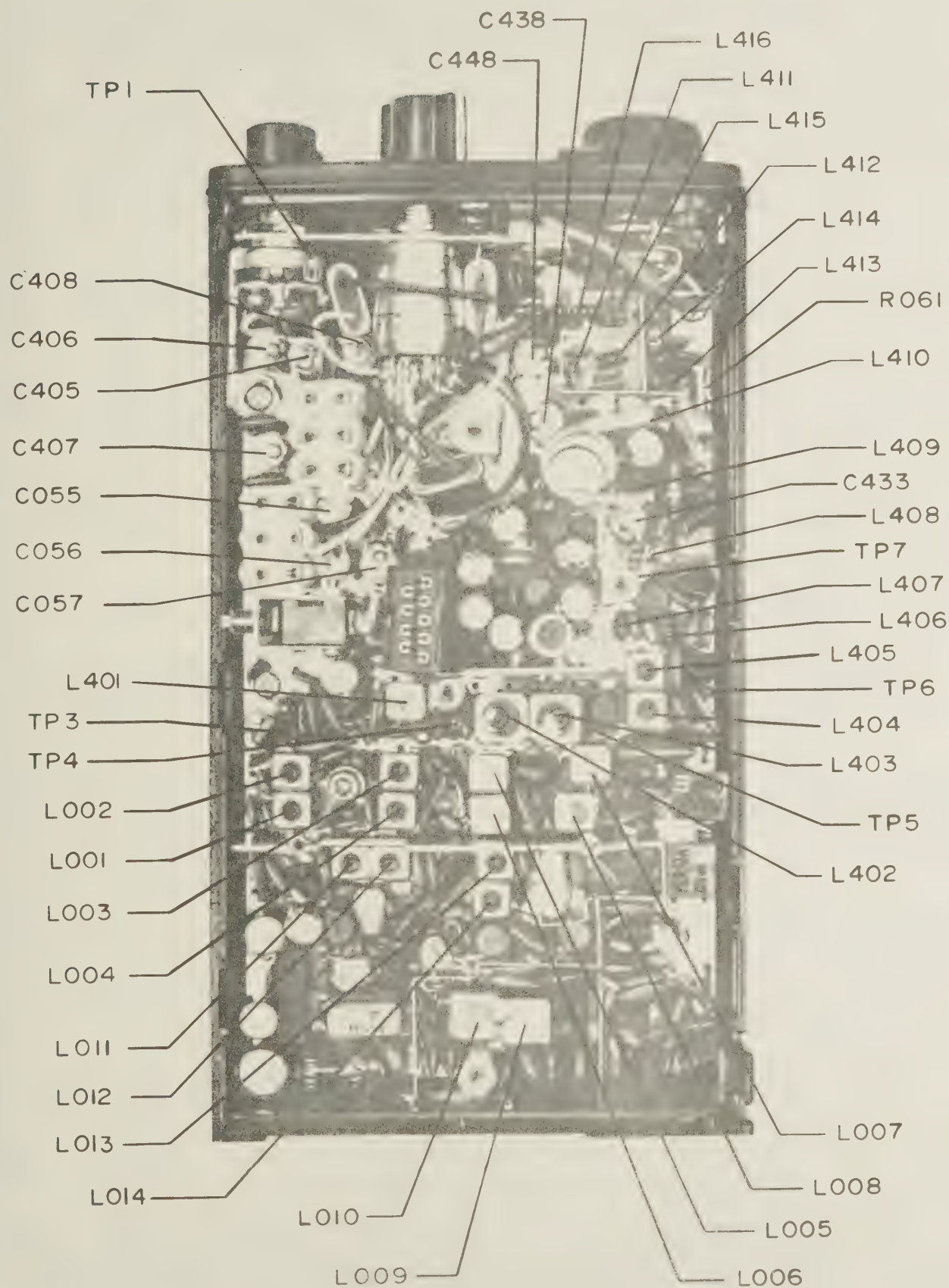
ADJUSTMENTS

Adjustments should be limited to setting the detector "crossover" point in the receiver, "netting" the transmitter and receiver crystals to frequency, and setting the deviation.

Setting "Crossover" Point - Set the detector "crossover" point as follows:

- (1) Inject a 100 μ V 455 kHz (± 10 Hz) signal through a 0.01 μ F capacitor to the receiver second mixer stage at the collector of Q004.
- (2) Connect a 25-0-25 μ A DC meter between TP1 and ground (TP1 is the unconnected lead between the VOL control and the bracket).
- (3) Using an SCC P/N AT-1 alignment tool, carefully adjust the cores in L009 (pink) and L010 (blue) to obtain a "zero" indication on the meter: These are the two shielded inductors at the bottom end of the circuit board.

ALIGNMENT REFERENCE POINTS



8-73
SR-C146A

CAUTION:

EXERCISE EXTREME CARE IN ADJUSTING THE INDUCTORS. THE CORES ARE BRITTLE, AND ARE SECURED WITH PAINT. APPLY A SMALL DROP OF ACETONE TO SOFTEN THE PAINT PRIOR TO ADJUSTING.

Netting Crystals - Net the transmitter and receiver crystals as follows:

- (1) Apply the output of a precision frequency meter (0,0001% maximum tolerance) to the ANT receptacle.
- (2) Adjust the frequency meter to provide a signal at the exact frequency for the receive channel to be "netted".
- (3) Using a Walsco No. 2525 (SCC P/N AT-2) alignment tool, adjust the proper trimmer capacitor for the crystal to be "netted" to obtain a "zero" indication on a 25-0-25 uA DC meter connected between TP1 and ground.
- (4) Disconnect the frequency meter from the ANT receptacle, and connect a 50-ohm dummy load in its place.
- (5) Adjust the frequency meter to indicate the exact frequency for the transmit channel to be "netted".
- (6) "Key" the transceiver and adjust the proper trimmer capacitor for the crystal to be "netted" until the correct frequency is indicated on the frequency meter.

Setting Deviation - The deviation is factory set for a nominal ± 7 kHz. Should you wish to change it to a value other than this (maximum ± 15 kHz) the following procedure should be as follows:

- (1) Locate the "deviation potentiometer", R432, and apply a drop of acetone to loosen the paint at the factory sealed setting.
- (2) Using a suitable deviation scope or meter, apply a 1000 Hz tone (or whistle into the microphone), and adjust R432 for the desired setting for "speak" deviation.
- (3) Apply a drop of paint or Red Glyptol to the control at that point to secure the setting.

ALIGNMENT PROCEDURE

Your 146A transceiver has been factory aligned for operation between 146 and 148 MHz to provide optimum performance within the portion of the band where most FM activity is found. If it is desired to shift the optimum operating range higher or lower than this portion, or if realignment of the RF circuits is required due to less of sensitivity, or power output, as indicated by the "Routine Performance Checks", it is recommended that this be done at the factory, or by an

authorized STANDARD COMMUNICATIONS CORP. service dealer.

If it is impractical to return the unit to the factory, or to a service dealer, realignment may be performed as follows:

- (1) Connect the RF probe of a VTVM between TP2 and ground (TP2 is located between L012 and L013). Set the VTVM for 5.0 volts full scale range.
- (2) Set the CH switch for a receive frequency in the middle of the overall range and adjust the cores in L011 thru L014 for maximum response on the VTVM.
- (3) Disconnect the RF probe from TP2 and connect it between the collector of Q006 and ground. Connect the RF output of an RF signal generator to the ANT receptacle.
- (4) Adjust the signal generator for approximately 10 uV output at the frequency used in step (2) and sequentially adjust the cores in L001 thru L008 for maximum response on the VTVM.
- (5) Recheck to verify the 20 dB quieting and squelch sensitivities as described in "Routine Performance Checks".
- (6) Disconnect the signal generator from the ANT receptacle and connect an RF power meter/dummy load in its place. Using SCC P/N AT-1 and AT-2 alignment tools, and an SCC P/N PT-1 plastic tweezer, adjust the transmitter RF stages in the following sequence; keying the transmitter and making the adjustments in each step to obtain maximum response on the appropriate meter.
- (7) Connect the DC probe of the VTVM between TP5 and ground (TP5 is located between L403 and L404): Set the VTVM for 5.0 volts full scale range and sequentially adjust the cores in L402 and L403 for maximum response on the VTVM.
- (8) Connect the DC probe between TP6 and ground (TP6 is located on the edge of the circuit board, adjacent to L404) and sequentially adjust the cores in L404 and L405 for maximum response on the VTVM.
- (9) Connect the DC probe between TP7 and ground (TP7 is located adjacent to L405) and carefully adjust the spacing between turns of L406 and L407 for maximum response on the VTVM.
- (10) Carefully adjust the spacing between turns of L408 and L409 and adjust C433 for maximum response on the RF power meter.
- (11) Carefully adjust the spacing between turns of L411 thru L416, and adjust C438 and C448 for maximum response on the RF power meter.

CRYSTAL JUMPERING

GENERAL

The 146A has been designed so that one crystal position may be jumpered and used for two (or more) switch positions. This is especially useful where it is desired to provide for "simplex" operation on a repeater input (or output) frequency.

PROCEDURE

- (1) Carefully unsolder the lead from the crystal socket on the circuit board to the CH switch terminal for the channel you wish to jumper.

NOTE:

Transmit crystals connect to the "1C" side of the CH switch, receive crystals to the "2C" side.

- (2) Install a jumper between the terminal you removed the lead from, and the terminal corresponding to the desired frequency.

CHANNELIZATION INFORMATION

These additional channels can be added to your radio as required. Any additional channel utilizing an existing TX or RX will not require a new crystal. The existing crystal wiring may be jumpered to the new channel position, as set forth in the preceding section on CRYSTAL JUMPERING resulting in multiple use of the same crystal. The 146A may be adjusted for operation on any frequency within the Two-Meter Band, but will only deliver optimum performance over a 2 MHz spread of frequencies. It has been factory tuned to 146.94 MHz and will provide optimum performance for frequencies between 146 and 148 MHz as adjusted. Generally "MARS" and "CAP" crystals may be installed with some loss in sensitivity and power output. The degree of degradation will depend upon the spread. If the spread is too great, the oscillators may not function. STANDARD COMMUNICATIONS CORP. recommends that extra crystals be ordered through your SCC Dealer. The crystal you receive will be of the same quality as crystals utilized in SCC's Marine and Land/Mobile transceivers. In addition, the crystal manufacturer uses standard test fixtures supplied by SCC which insure that crystals supplied can be netted to frequency in your transceiver.

AMATEUR FM GLOSSARY

- CAPTURE - The ability of an FM receiver to pick-out the strongest signal while totally rejecting the weaker one.
- CARRIER OPERATED RELAY (COR) - A circuit which is activated by the reception of a signal by an associated receiver.
- CHANNEL - Any specified operating frequency.
- CHANNEL ELEMENT - An assembly used in place of a crystal in controlling either the transmitter or receiver.
- CHANNELIZATION - The addition of extra channels to a transceiver.
- CLOSED REPEATER - A repeater with a tone input or other device to limit use to certain individuals; a repeater for use by a specific club or group.
- COFFIN SETS - Term used with old FM equipment utilizing a separate Tx and Rx.
- CONTINUOUS TONE CONTROLLED SQUELCH SYSTEM (CTCSS) - An uninterrupted sub-audible tone superimposed on the carrier, for the purpose of opening receiver inputs (as on a repeater) for selective reception of desired transmissions, rather than all signals on a specific frequency.
- DEVIATION - Limits to carrier deviation of frequency shift on either side of the center frequency expressed as \pm kHz.
- DEVIATION ACCEPTANCE - Ability of an FM receiver to pass information of a specific deviation.
- DISCRIMINATOR - Circuitry in a receiver for FM detection. It connects the FM signal to AM and then demodulates the AM signal, producing the desired audio signal.
- DUPLEX - To transmit and receive simultaneously on two separate frequencies to maintain communications, as with a repeater.
- DUPLEXER - A device which allows simultaneous transmission and reception from a single antenna.
- LIMITER - An IF circuit in an FM receiver which keeps the audio output from the discriminator at a constant output.

MACHINE - A term used to express a complete repeater system.

NARROW-BAND - ± 5 kHz deviation (not to be confused with NB FM, same band width as AM/A3.)

OPEN REPEATER - A repeater that is open for use by all amateurs.

OVERLAP - The simultaneous coverage of at least two repeaters using the same input and output frequencies.

RADIO - FM'ers term for his rig.

REED - Frequency sensitive encased circuits used in selective tone signaling.

REMOTE - A unit used to control a base station at other than the base station's location.

REPEATER - A transmitter and receiver interconnected so as to simultaneously re-transmit signals received on one frequency to another. A repeater is generally located atop a high building or mountain top to gain the elevation advantage required for extended range on the VHF/UHF frequencies.

SIMPLE DUPLEX - To transmit and receive, but not simultaneously, on two separate frequencies.

SIMPLEX - Transmitting and receiving on the same frequency.

STRAPPING - The term used when two or more switch positions are jumpered to allow the use of a single crystal with a number of other crystals for various frequency combinations.

SWING - Total FM bandwidth, or frequency deviation X2.

TIME-OUT - Device on a repeater to limit transmission to a specified time. The normal time span is from 1 1/2 to 3 minutes.

TONE-BURST - A single tone of specified duration and frequency used to open repeater inputs.

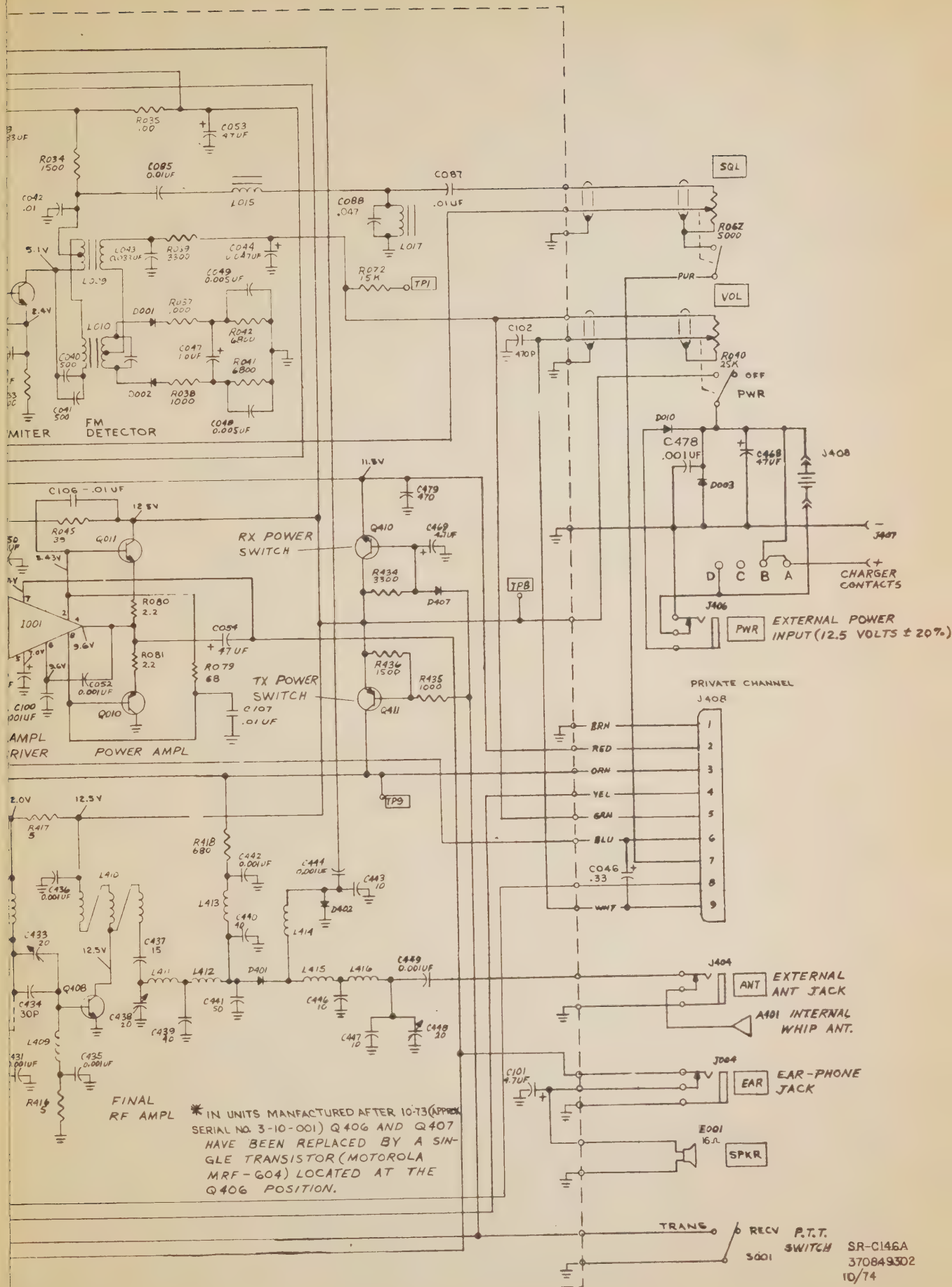
WIDE-BAND - ± 15 kHz deviation.

ZERO - To set a crystal for "0" reading on a uA meter connected to the discriminator output, to insure that you are receiving on the proper frequency.

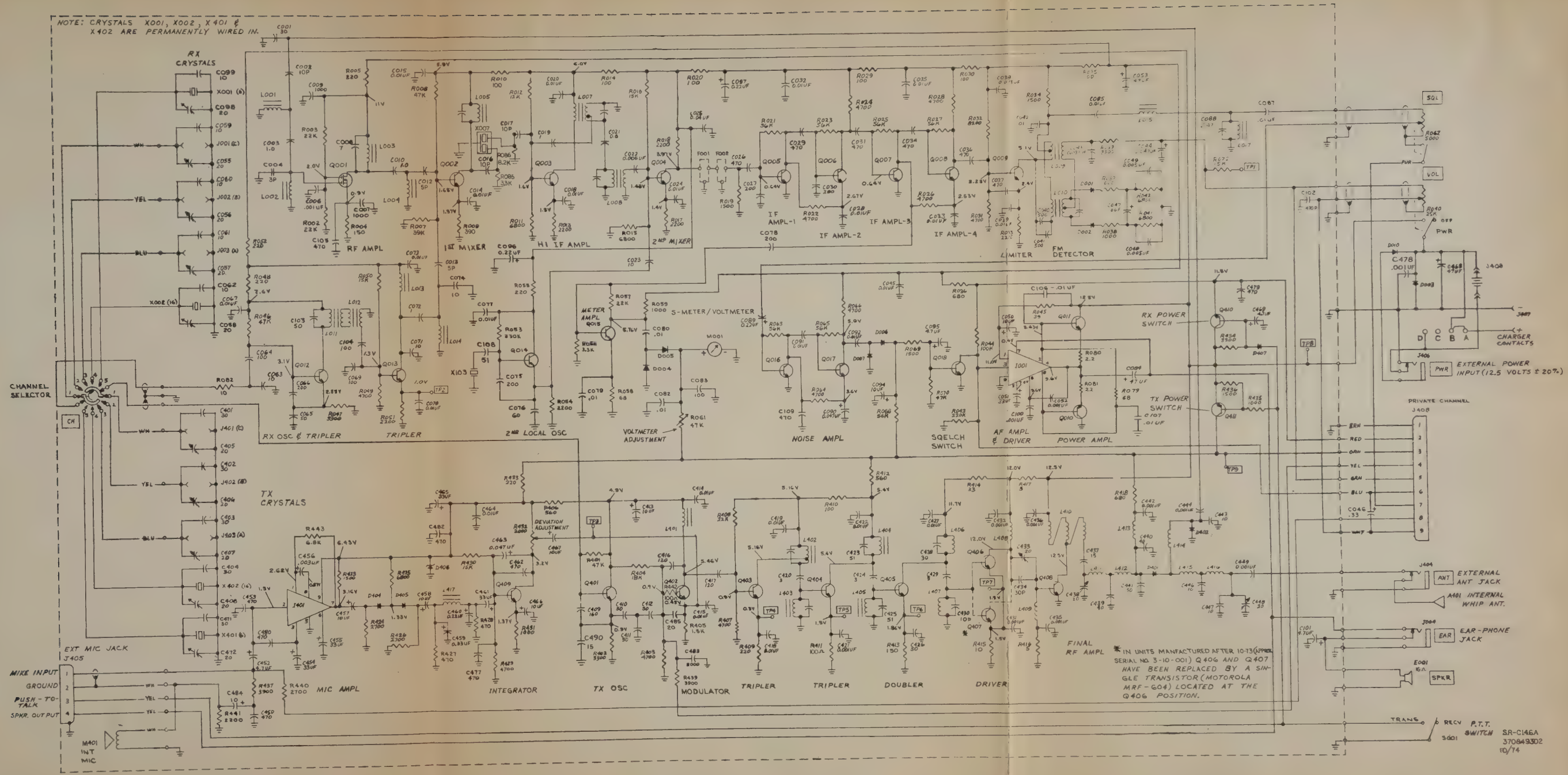
ZERO OR NETTING - To set a crystal for "0" reading on a uA meter connected to the discriminator output, to insure that you are receiving on the proper frequency.

DRAWING NOTES

1. There are two different series of the schematic diagram and the P.C. boards. The major difference between the two series is that the receiver audio frequency integrated circuit of the first series is replaced with discrete transistors in the second series. The first series is made up of all units with serial numbers less than 512001. The second series begins at 512001 and includes all subsequent numbers, and all seven-digit serial numbers (U260001 and subsequent).
2. Capacitance values are in pico-farads when not marked and in micro-farads when followed by a "uF".
3. All schematic indicated voltages are to common ground (chassis), using a VTVM (HP427A or equivalent). Use RF probe when measuring RF circuits.
4. All voltage measurements are taken with 13.8 VDC (negative ground) regulated input as a power source.
5. The printed circuit (P.C.) boards illustrate the layout of the electrical components as viewed from the bottom (foil) side of the board.

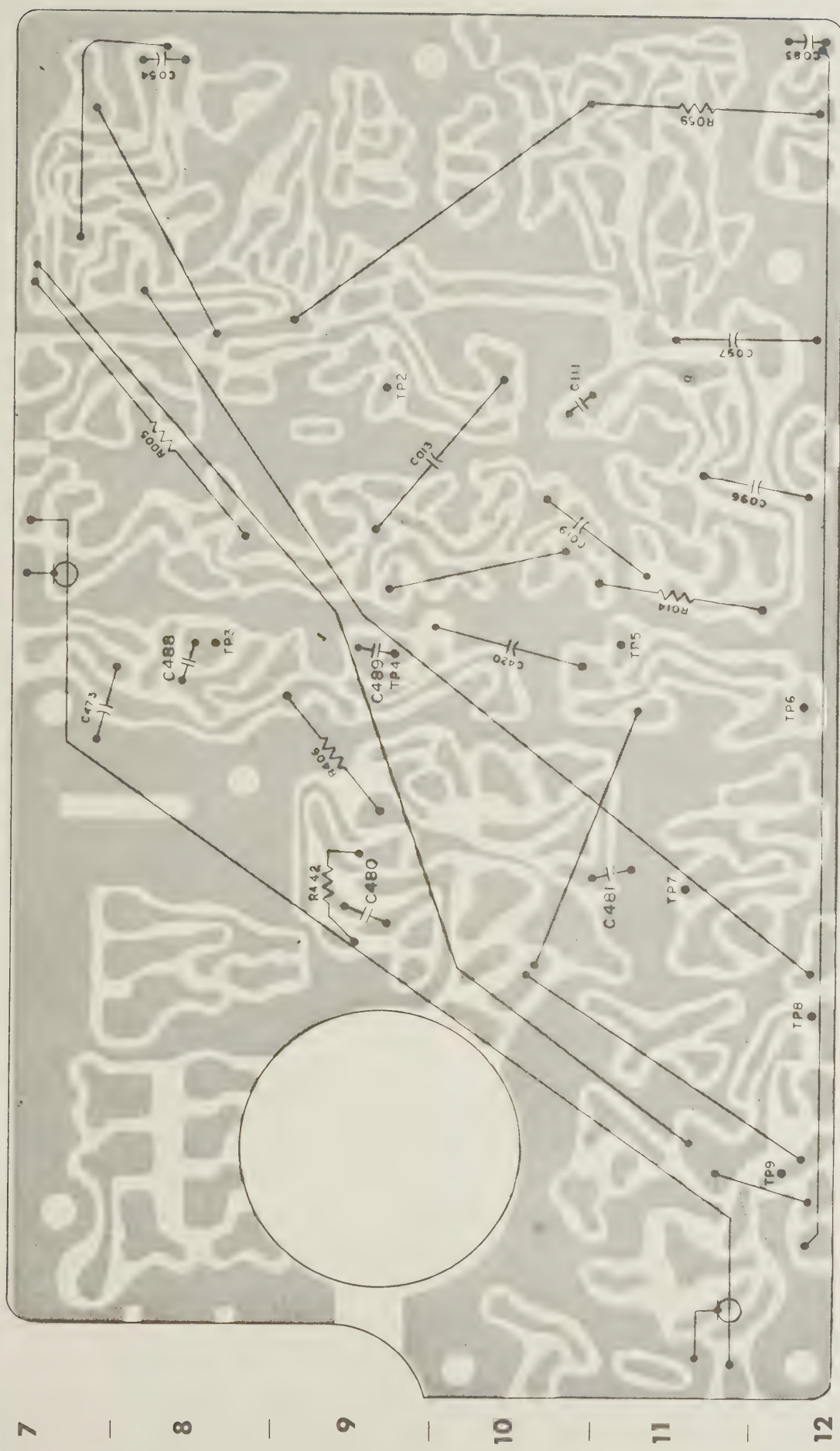


C146A SCHEMATIC DIAGRAM (PREVIOUS TO S/N 512001)



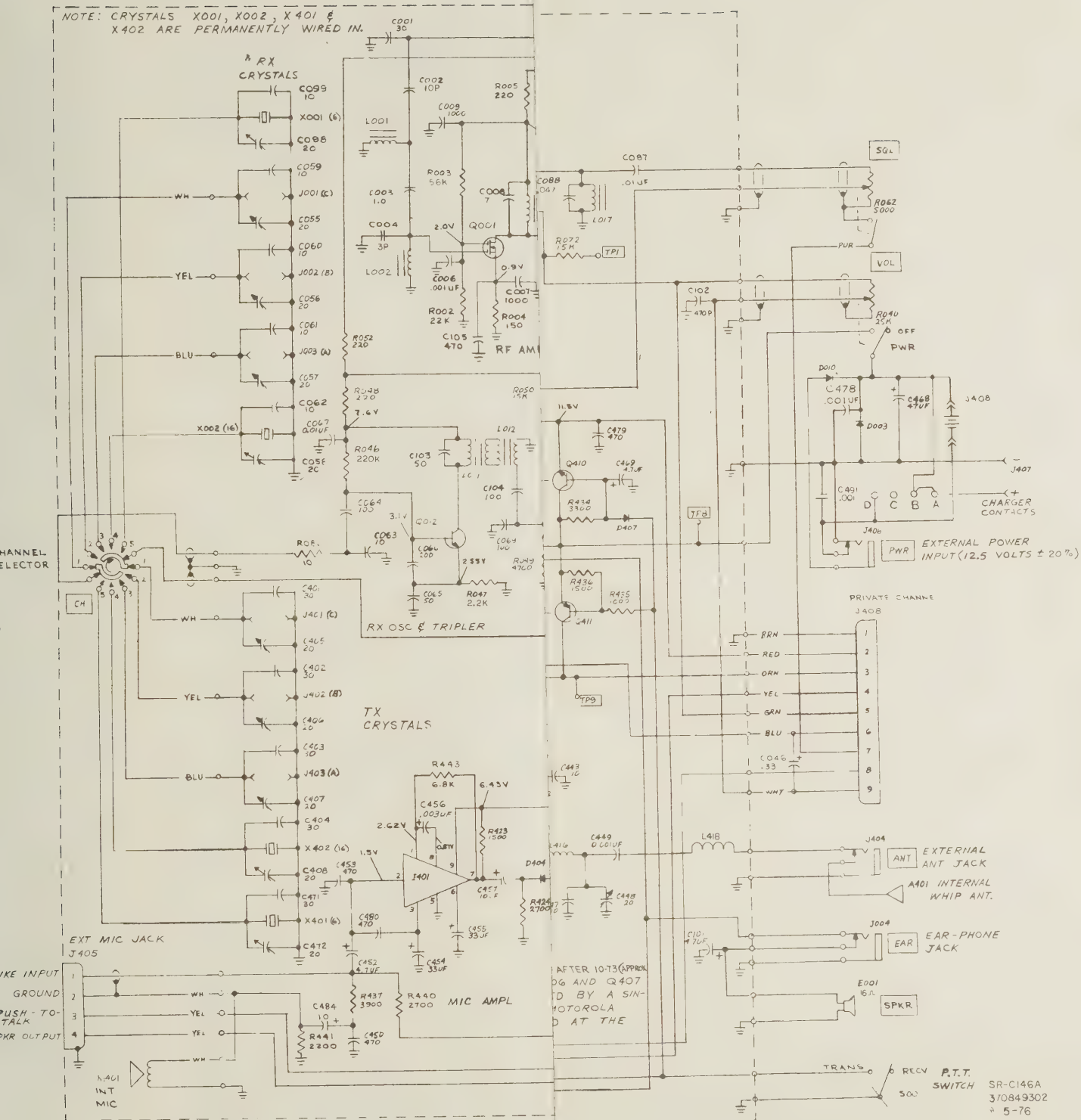
C146A SCHEMATIC DIAGRAM (PREVIOUS TO S/N 512001)

A B C D E F G H I



370849404
10/74

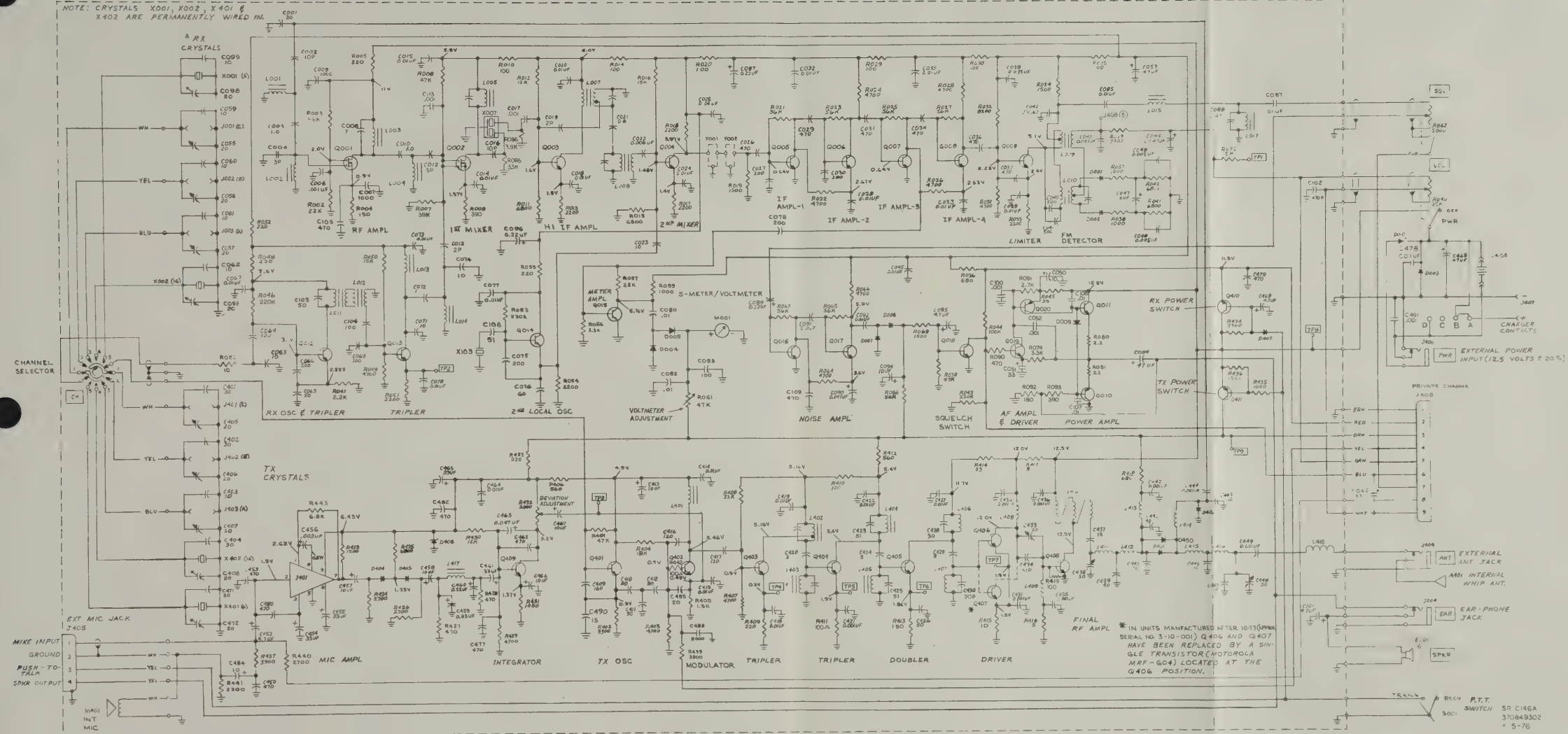
C146A P.C. BOARD - FOIL SIDE VIEW
(PREVIOUS TO S/N 512001)



SR-C146A SCHEMATIC DIAGRAM

C146A SCHEMATIC DIAGRAM
12001 & SUBSEQUENT - U26001 & SUBSEQUENT

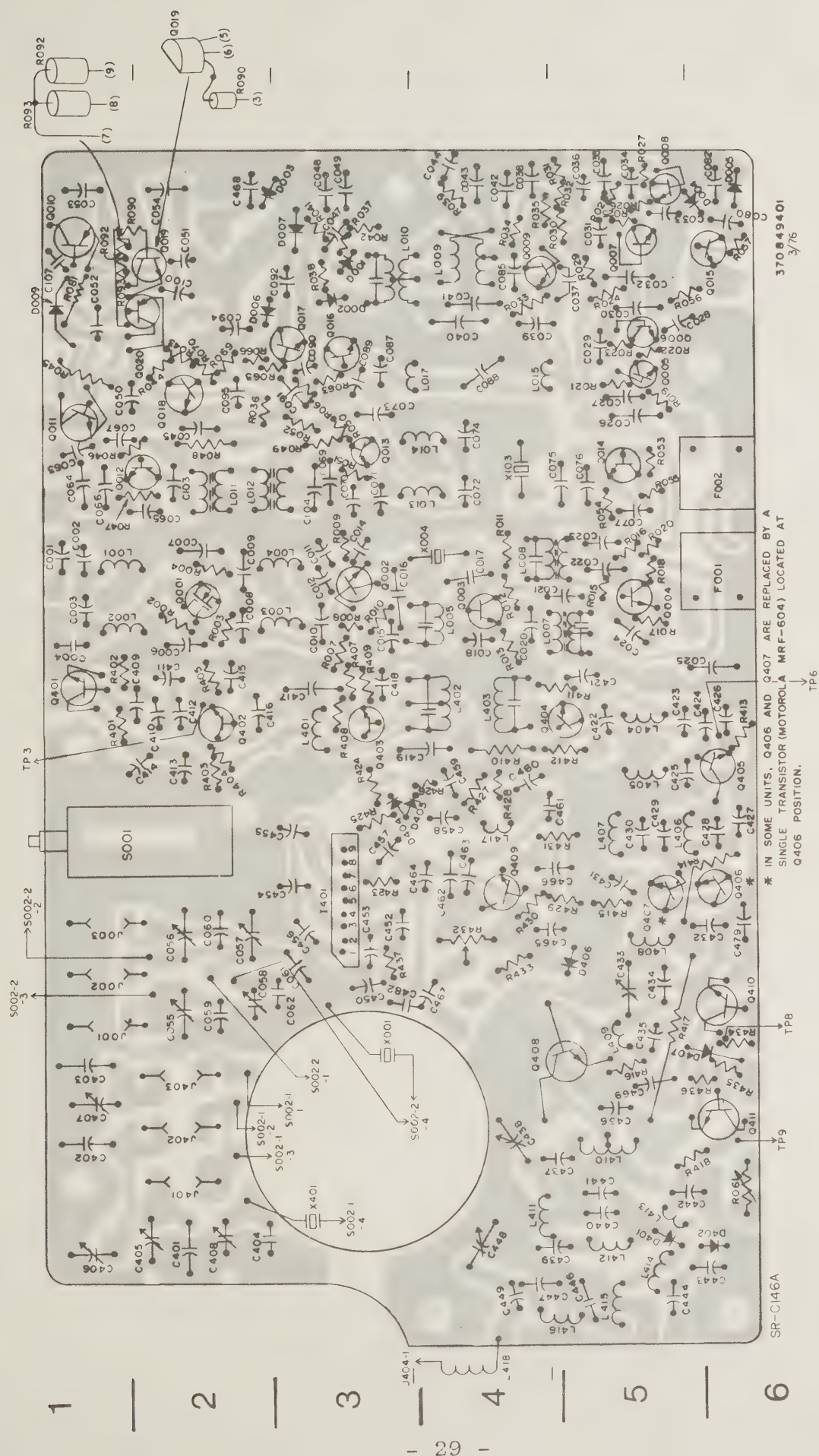
NOTE: CRYSTALS X001, X002, X401 & X402 ARE PERMANENTLY WIRED IN.



SR-C146A SCHEMATIC DIAGRAM

C146A SCHEMATIC DIAGRAM
(S/N 512001 & SUBSEQUENT - U26001 & SUBSEQUENT)

A | B | C | D | E | F | G | H | I



C146A P.C. BOARD - FOIL SIDE VIEW WITH COMPONENT OVERLAY
(s/n 512001 & SUBSEQUENT)



- 30 -

PARTS LIST

1. The following parts list includes all electrical parts except 1/8 watt, +10%, fixed composition resistors. Values (ohms) for unlisted resistors are shown on the schematic diagram.
2. Selected mechanical parts, as illustrated by the Exploded Parts View, are listed in the Mechanical Parts List.
3. The P.C. BOARD LOCATION column references each part to a corresponding location on the printed circuit board. An "EPV" in this column indicates that the part is shown on the Exploded Parts View. An asterisk (*) in this column indicates that the part is not mounted on a printed circuit (P.C.) board.
4. Components preceded by a double asterisk (**) in the REFERENCE DESIGNATION column apply only to units with serial numbers prior to 512001. Where a reference designator is listed twice, the value without the double asterisk applies to units with serial numbers 512001 and subsequent (includes also serial numbers U260001 and subsequent).

C146A ELECTRICAL PARTS LIST

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
<u>CAPACITORS:</u>					
C001	30pF	Fixed Ceramic	DD15300020	F1	\$.17
C002	10pF	Fixed Ceramic	DD12100060	F1	.17
C003,010 **019,072	1pF	Fixed Ceramic	DD10010020	F1,F3 F10,G4	.17
C004	3pF	Fixed Ceramic	DD11030010	F1	.17
C006,007,009 013,017	0.001uF	Fixed Ceramic	DK17102010	F2,F2,F2 F4,F10	.17
C008	7pF	Fixed Ceramic	DD12070040	F2	.17
**C011	20pF	Fixed Ceramic	DD16200040	F3	.17
C012	5pF	Fixed Ceramic	DD11050020	F3	TBD
**C013	5pF	Fixed Ceramic	DD11050010	F10	TBD
C014,015,018 028,033,035 067,070,073 077,**079,085 087	0.01uF	Fixed Ceramic	DK78103010	F3,F3,F4 H5,I5,I5 G1,G3,G3 G5,H6,H4 H3	.76
C016	10pF	Fixed Ceramic	DD16100010	F4	.17
**C017	10pF	Fixed Ceramic	DD15100020	F4	TBD
C019	2pF	Fixed Ceramic	DD11020010	F10	.17
C020,024,032 045	0.01uF	Fixed Ceramic	DK18103030	F4,F5,H5 G2	.17
**C021	0.6pF	Fixed Ceramic	DD16006010	F5	.17
C022	0.005uF	Fixed Ceramic	DK17502010	F5	.17
C023,059,060 061,063,071 074,099	10pF	Fixed Ceramic	DD12100060	F5,C2,D2 C3,G1,G3 G4,*	.17
C025	0.04uF	Fixed Film	DK17403010	F6	.17
C026,029,031 034,036,037	470pF	Fixed Ceramic	DK16471010	G5,H5,I5 I5,I5,H5	.17
C027,030,066 075,078	200pF	Fixed Ceramic	DD16201030	H5,H5,G1 G5,I5	.17

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
C038,043	0.033uF	Fixed Film	DK17333010	I4,I4	\$.17
C039,042,080 082,091,092	0.01uF	Fixed Film	DF17103010	H4,I4,I6 I6,H3,H3	.17
C040,041	500pF	Fixed Ceramic	DD16501010	H4,H4	.17
C044,090	0.047uF/35VDC	Fixed Electrolytic	EW47303510	I4,H3	.92
C046	0.33uF/25VDC	Fixed Electrolytic	EW33402510	H2	.94
C047	1uF/25VDC	Fixed Electrolytic	EW10501510	I3	1.02
C048,049	0.0047uF	Fixed Film	DF17472010	I3,I3	.17
C050	10uF/16VDC	Fixed Electrolytic	EV10601660	H1	.18
C051	33uF/10VDC	Fixed Electrolytic	EW33601010	I2	2.67
C052	0.001uF	Fixed Film	DF17102010	H1	.17
C053,054	47uF/16VDC	Fixed Electrolytic	EA47601690	I1,I8	2.67
C055,056,057 058,098	20pF	Trimming	CT12000020	C2,D2,D2 *,*	.83
C062	20pF	Fixed Ceramic	DD15200060	*	.17
C064,069	100pF	Fixed Ceramic	DD15101020	G1,G3	.17
C065	50pF	Fixed Ceramic	DD15500040	G2	.17
C076	60pF	Fixed Ceramic	DD15600010	G5	.17
C083	100uF/10VDC	Fixed Electrolytic	EA10701090	I12	.25
C088	0.047uF	Fixed Ceramic	DF17473010	H4	TBD
C089,096,097	0.22uF/25VDC	Fixed Electrolytic	EW22402510	H3,F12,G12	1.35
C094	10uF/10VDC	Fixed Electrolytic	EW10601060	H2	1.57
C095	4.7uF/16VDC	Fixed Electrolytic	EV47501610	H2	1.14
C100	0.001uF	Fixed Ceramic	DK17102010	H2	.17
C101	4.7uF/35VDC	Fixed Electrolytic	EA47503590	*	.21
C102,105	470pF	Fixed Ceramic	DK16471010	*,*	.17
C103	50pF	Fixed Ceramic	DD16500020	G2	.17
C104	100pF	Fixed Ceramic	DD15101020	G3	.17

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
C106,107	0.01uF	Fixed Ceramic	DK18103030	H1,I1	\$.17
C108	51pF	Fixed Mica	DF36510010	*	.18
C109	470pF	Fixed Ceramic	DK10471010	*	TBD
C401,402,403 404,428,471 **434	30pF	Fixed Mica	DF36300020	A2,B1,C1 *,D6,* C5	.18
C405,406,407 408,433,438 448,472	20pF	Trimming	CT12000020	A2,A1,B1 *,C5,B4 A4,*	.83
C409	160pF	Fixed Mica	DF35161500	F2	.43
C410,411,412 426	50pF	Fixed Ceramic	DD15500040	E2,F2,E2 E6	.17
**C413,491	0.001uF	Fixed Ceramic	DK17102010	E2,*	.17
C413	10uF/16VDC	Fixed Electrolytic	EA10601690	E2	.18
C414,419,422 427,464	0.01uF	Fixed Ceramic	DK18103030	E2,E3,E5 D6,D4	.17
C415,418	0.01uF	Fixed Ceramic	DK78103010	E2,E3	.76
C416,417	120pF	Fixed Ceramic	DD16121010	E2,E3	.17
C420,424	3pF	Fixed Ceramic	DD11030010	*,E6	.17
C421,431,432 435,436,442 444,449,478	0.001uF	Fixed Ceramic	DK17102010	E5,D5,D6 C5,B5,B6 A5,A4,*	.17
C423,425	51pF	Fixed Mica	DF36510010	E5,E5	.18
C429	5pF	Fixed Ceramic	DD11050030	D5	.17
**C430	10pF	Fixed Mica	DD12100010	D5	TBD
C430	20pF	Fixed Mica	DF36200020	D5	.17
C434	51pF	Fixed Mica	DF36510020	C5	.25
C437,490	15pF	Fixed Ceramic	DD16150030	B4,*	.17
C439,440	40pF	Fixed Ceramic	DD15400010	A5,B5	.17
C441	50pF	Fixed Ceramic	DD16500010	B5	.17
C443,446,447	10pF	Fixed Ceramic	DD12100010	A6,A5,A4	.17

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
C450,453,462 477,479,480 482	470pF	Fixed Ceramic	DK16471010	C3,D3,D4 *,D6,D9 C3	\$.17
C452,469	4.7uF/16VDC	Fixed Electrolytic	EA47503590	D3,B5	.25
C454,455,461	33uF/3VDC	Fixed Electrolytic	EV33600310	D3,D3,E4	1.22
C456	0.0033uF	Fixed Electrolytic	DF17332010	D3	.17
C457,458,466 467	10uF/16VDC	Fixed Electrolytic	EA10601690	D3,D4,D4 C4	.18
C459	0.33uF/25VDC	Fixed Electrolytic	EW33402510	E4	.94
C460	0.22uF/25VDC	Fixed Electrolytic	EW22402510	E4	1.35
C463	0.047uF/35VDC	Fixed Electrolytic	EW47303510	D4	.92
C465	33uF/10VDC	Fixed Electrolytic	EA33601090	D4	.21
C468	47uF/16VDC	Fixed Electrolytic	EA47601690	I1	.23
C483	0.002uF	Fixed Ceramic	DC18202020	*	.51
C484	10uF/10VDC	Fixed Electrolytic	EW10601010	*	1.22
C485,**486	20pF	Fixed Ceramic	DD16200010	*,*	.17

DIODES:

D001,002	Germanium	HD10001050	I3,H3	\$.20
D003,010	Silicon	HD20001100	I2,*	.43
D004,005	Germanium	HD10001010	I6,I6	.43
D006,007	Silicon	HD20011050	H2,I3	.26
D009	Varistor	HV00004060	H1	TBD
D401,402,450	Silicon	HD20001200	*,A6,H2	1.91
D404,405,407	Silicon	HD20011050	D3,E4,E3	.26
D406	Zener	HD30023090	C5	.76

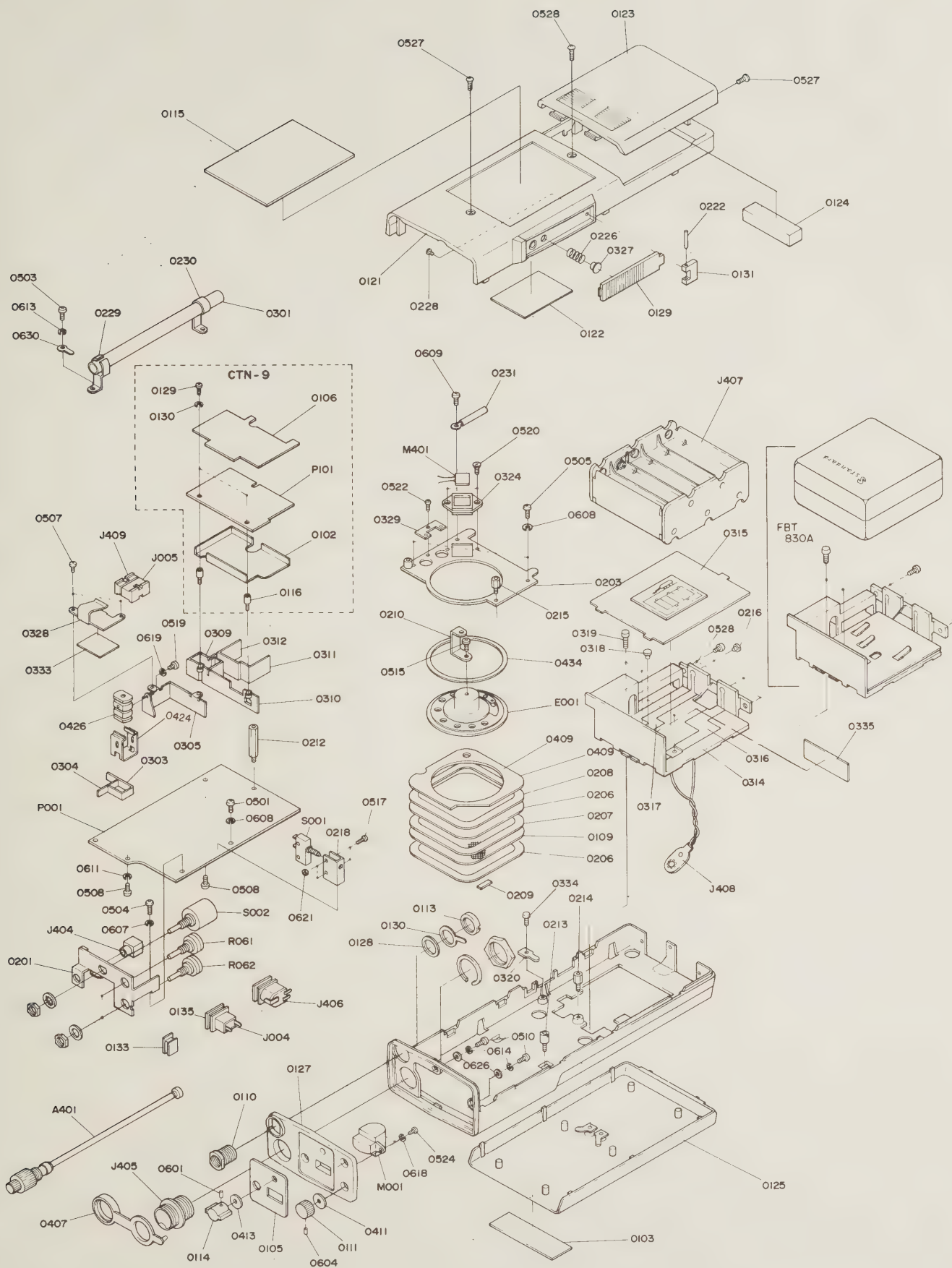
REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
<u>INDUCTORS:</u>					
L001,002,003 004		Antenna Coil	LA50018020	F1,F1,F3 F3	TBD
L005		IF Coil	LI55016152	F4	TBD
**L006		IF Coil	LI55016182	F4	\$ 1.39
L007		IF Coil	LI55016132	F4	TBD
L008		IF Coil	LI55016140	F4	1.27
L009		IF Coil	LI70030360	I4	.60
L010		IF Coil	LI70030350	I3	.69
L011,012		RF Coil	LI50028012	G2,G2	1.12
L013,014		Antenna Coil	LA50018030	G4,G4	1.12
L015,017		Choke Coil	LC13940010	H4,H3	.32
L401		RF Coil	LA55016010	E3	1.39
L402,403		RF Coil	LA70196040	E4,E4	.94
L404,405		Antenna Coil	LA50018030	E5,E5	1.12
L406,407,411 412		Choke Coil	LC15000012	D5,D5,B4 A5	.18
L408		Choke Coil	LC12800010	D5	.21
L409		Choke Coil	LC13810020	C5	.33
L410		Twist Coil	LM13422010	B5	.92
L413		Choke Coil	LC13810010	B5	.41
L414		Choke Coil	LC11610010	A5	.18
L415,416		Choke Coil	LC14000010	A5,A5	.21
L417		Choke Coil	LC22260020	D4	.51
L418		Choke Coil	LC14000010	E3	.25

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
<u>RESISTORS:</u>					
R040	25K ohm w/Switch	Variable Comp.	RB12530023	*	\$ 1.16
R061	47K ohm	Variable Comp.	RA04730010	*	TBD
R062	5000 ohm	Variable Comp.	RB15020220	*	1.49
R080,081	2.2K ohm/ 1/4 watt	Fixed Composition	RC10022140	H1,H1	TBD
R415	10 ohm/ 1/4 watt	Fixed Composition	RC10100140	D5	.17
R416	5 ohm/1/4 watt	Fixed Composition	RC10050140	C5	.17
R417	39 ohm/ 1/4 watt	Fixed Composition	RC10390140	C5	TBD
R432	2000 ohm	Trimming	RA02020090	D4	.33
R901	5 ohm/1/4 watt	Fixed Composition	RC10050140	*	.17
R902	10 ohm/ 1/4 watt	Fixed Composition	RC10100140	*	.17
R903	22 ohm/ 1/4 watt	Fixed Composition	RC10220140	*	.17
R904	33 ohm/ 1/4 watt	Fixed Composition	RC10330140	*	.17

NOTE: Resistors not listed are standard fixed composition, +10%, 1/8 watt.
The resistance values (ohms) are shown on the schematic diagrams.

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
<u>TRANSISTORS:</u>					
Q001,002		Mosfet	HF40051100	F2,F3	\$ 2.24
Q003,004,005 006,007,008 009,012,013 014,015		NPN Silicon	HT305351B0	F4,F5,H5 H5,H5,I5 H4,G1,G3 G5,H6	.76
Q010		PNP Germanium	HT106831B0	I1	.99
Q011		NPN Silicon	HT313831B0	G1	.83
Q016,017,018 019		NPN Silicon	HT309451Q0	H3,H3,H2 I2	TBD
Q020		NPN Silicon	HT106731B0	H2	TBD
Q401,402		NPN Silicon	HT305351B0	E1,E2	.76
403		NPN Silicon	HT304601B0	E3	.41
Q404,405,406 407		NPN Silicon	HT30387100	E5,E6,D6 D5	1.22
Q408		NPN Silicon	HT31001100	C5	14.44
Q409		NPN Silicon	HT309451Q0	D4	.91
Q410		NPN Silicon	HT312131B0	C6	.66
Q411		PNP Germanium	HT106731B0	B6	.83

REFERENCE DESIGNATION	VALUE	TYPE	SCC PART NO.	P.C. BOARD LOCATION	SUGG. LIST PRICE
<u>MISCELLANEOUS ELECTRICAL:</u>					
A401		Whip Antenna	YR04049012	EPV	\$ 3.71
E001	16 ohms	Speaker	QK00503082	EPV	3.71
FC01,002		Ceramic Filter	FG455304E0	F6,*	5.00
**I001		Integrated Circuit	HC10013030	I1	2.64
I401		Integrated Circuit	HC10014030	D3	2.64
J001,002,003		Crystal Socket	YJ03000020	C1,C1,D1	.17
J004		Jack, Earphone	JY01001020	*	.26
J401,402,403		Crystal Socket	YJ03000020	B2,B1,C2	.17
J404		Jack, Antenna	YJ01001020	EPV	.26
J405		Jack, Microphone	YJ10000650	EPV	2.56
J406		Jack, Power	YJ04000540	EPV	.60
J407		Battery Case	YJ14000020	EPV	1.75
J408		Snap	YJ09000082	EPV	.25
J409		9-pin plug	YP10001060	*	TEB
J410		Jack	YJ10000520	*	2.28
M001		DC Meter	IM11014032	EPV	4.95
M401		Microphone	MS40000020	EPV	9.08
X001		Crystal (RX)	Selected Value	C3	6.50
X002		Crystal (RX-2nd Osc.)	Selected Value	*	6.50
X007		Crystal Filter	XU411700N5	*	TEB
X401		Crystal (TX)	Selected Value	B3	6.50
X402		Crystal (TX)	Selected Value	*	6.50
Y001		Microphone Switch	SC01020060	D1	1.24
Y002		Rotary Switch	SR02050092	EPV	11.50



C146A EXPLODED PARTS VIEW

C146A MECHANICAL PARTS LIST

REFERENCE DESIGNATION	TYPE	SCC PART NO.	SUGG. LIST PRICE
0102	Case, Front	3729064016	\$ 10.31
0103	Plate	3653203013	.38
0105	Indicator	3708265013	.26
0108	Indicator	3708265032	.66
0109	Plate	3653003010	.41
0110	Knob	3782154012	TBD
0111,0112	Knob	3653154012	1.32
0113	Escutcheon K	3653063500	TBD
0114	Knob	3782154010	1.16
0115	Contractor	4596123030	TBD
0116	Indicator	3708265024	TBD
0121	Cover	3653257111	1.83
0122	Collar	3729055034	1.14
0123	Cover	3653257024	.65
0124	Nut	53228089E2	.51
0125	Cover	3653063016	.83
0127	Cover	3653063026	2.30
0128	Terminal	YL03010220	TBD
0129	Button	3512270013	.25
0130	Buffer	4596056010	TBD
0131	Holder	3512271013	.25
0132	Contractor	4596123030	TBD
0133	Indicator	3653265032	.17
0134	Bracket	3653160013	.14
0201	Chassis	5759105010	1.65
0203	Chassis	3653105504	1.65
0204	Chassis	3653105024	TBD

REFERENCE DESIGNATION	TYPE	SCC PART NO.	SUGG. LIST PRICE
0205	Support	3653101030	TBD
0206,0207,0208 0209	Seal	3653122010	\$.17
0210	Bracket	3653160030	TBD
0211	Bracket	3653160045	.33
0212	Support	3653101010	.18
0123	Support	3653101042	.17
0214,0215	Support	3653101022	.17
0216,0217	Contractor	3653123010	.17
0218	Bracket	3512160500	.99
0219	Bracket	3514160010	TBD
0220	Bracket	3512104010	TBD
0222	Pin	3512254020	.17
0223	Case, Battery Tray	4667064012	TBD
0224	Cover	4596053010	TBD
0226	Spring	71101599L0	.10
0227	Label	3792861010	TBD
0228	Bracket	3512160100	.17
0229	Holder	3653271010	.46
0230	Holder	3653271020	.46
0231	Clamper	1382005030	.17
0232,0233	Contractor, Battery Tray	4596123010	TBD
0234	Eyelet, Battery Tray	56483030G0	TBD
0235	Screw, Battery Tray	51100204B0	.10
0301	Shield	3653109013	.38
0303	Shield	3729109030	.26
0304	Shield	3653109030	.17
0305	Shield	3729109022	.43

REFERENCE DESIGNATION	TYPE	SCC PART NO.	SUGG. LIST PRICE
0309	Shield	3653109062	\$.25
0311	Shield	3653109070	.21
0312	Shield	3553109083	TBD
0314,0315,0316 0317,0318,0319 0320	Shield	3620109010	.17
0323	Protector	3653269010	.17
0325	Lever	3653354010	.36
0327	Lever	3653354022	.39
0328	Bracket	3730160022	.69
0329	Bracket	3527160500	TBD
0333	Contactoer	4596123500	TBD
0334	Contractor	4596123040	TBD
0335	Eyelet	56332020G0	.10
0401,0402	Indicator	3653265102	.28
0404,0405	Indicator	3653265112	.25
0406	Indicator	3653265120	.25
0407	Cover, Mic. Recp.	3653053022	.38
0409	Spacer	3653118012	.25
0411,0413	Spacer	3539118020	.17
0420	Terminal	YL14020020	.17
0426	Insulator	3653120110	TBD
0428	Heat Sink	3653267012	.30
0432,0433	Spacer	3653118020	.17
0434	Spacer	3653118030	TBD
0501,0503	PHM Screw	51062606E0	.17
0504,0505,0507 0508	PHM Screw	51062605E0	.17
0510	PHM Screw	51062604E0	.17

REFERENCE DESIGNATION	TYPE	SCC PART NO.	SUGG. LIST PRICE
0517	PHM Screw	51060210E0	\$.17
0520	FHM Screw	51040204E0	.17
0522	PHM Screw	51060203E0	.17
0524	PHM Screw	51061704E0	.17
0527,0528	Screw	51142606B0	.10
0530	Screw	51142604B0	.10
0532,0533	Screw	51042604H0	.10
0534,0535	Screw	50042604B0	.10

USA-2

DESK TOP CHARGER



OWNER'S MANUAL



Standard Communications Corp.

DESCRIPTION

The sc-uSA-2 "DESK TOP CHARGER" is an electronic solid-state battery charger and base station adapter designed for charging the nickel-cadmium battery pack used with STANDARD COMMUNICATIONS CORP.'S handheld transceiver series sr-cl46A, sr-c830S, sr-c830L, and sr-c730L. In addition, it permits interconnection to a base station antenna, as well as charging a second battery pack, which is out of the unit.

OPERATING INSTRUCTIONS

1. Connect the AC power cord from the sc-uSA-2 to a source of 120 volt AC current.
2. Place the handheld transceiver into the DESK TOP CHARGER with its front facing the front of the CHARGER. When the charging contacts at the bottom of the handheld make contact with those in the charger, the red pilot lamp on the DESK TOP CHARGER will illuminate. If the red lamp does not illuminate it means the SA-2 is not charging. Before assuming the SA-2 is defective, check the position of the handheld in the SA-2 and make certain that the DESK TOP CHARGER and handheld transceiver are both facing forward.
3. The DESK TOP CHARGER is designed for ease in charging the battery in your handheld transceiver. An additional feature is that it can be used as a base holder on your desk for your handheld whether or not a charge is required. The handheld can remain on your desk in the charger indefinitely. The charging rate has no detrimental effect on the battery pack, regardless of the length of time the batteries remain in the CHARGER.
4. The DESK TOP CHARGER has facilities to re-charge a spare battery and the battery pack in the transceiver simultaneously. To charge the external battery pack, connect the accessory adapter cable which is supplied with the SA-2 and insert the plug into the jack at the back side of the CHARGER. The red pilot lamp will not illuminate if only an external battery is being charged.

NOTE

The batteries inside the handheld transceiver and the spare battery pack can be charged simultaneously. The only consideration is that each battery will charge at half the normal charging rate of the DESK TOP CHARGER.

5. To use the DESK TOP CHARGER as a base station adapter, connect an external base antenna to the connector at the rear of the CHARGER. Cable assembly (SCC P/N sr-cAD) is available for this purpose. The cable assembly plug at the end of the cable can be connected to the antenna receptacle on the handheld transceiver (ANT). The portable antenna in the handheld transceiver is automatically disconnected when connected to the external antenna.

CAUTION

DO NOT ATTEMPT TO CHARGE OTHER THAN RE-CHARGABLE NI-CAD BATTERIES. THE RATING OF THE BATTERY SHOULD BE 400 MAH OR GREATER.

NOTE: Typical charge current-terminal voltage vs Time curves are shown in Figure 2.

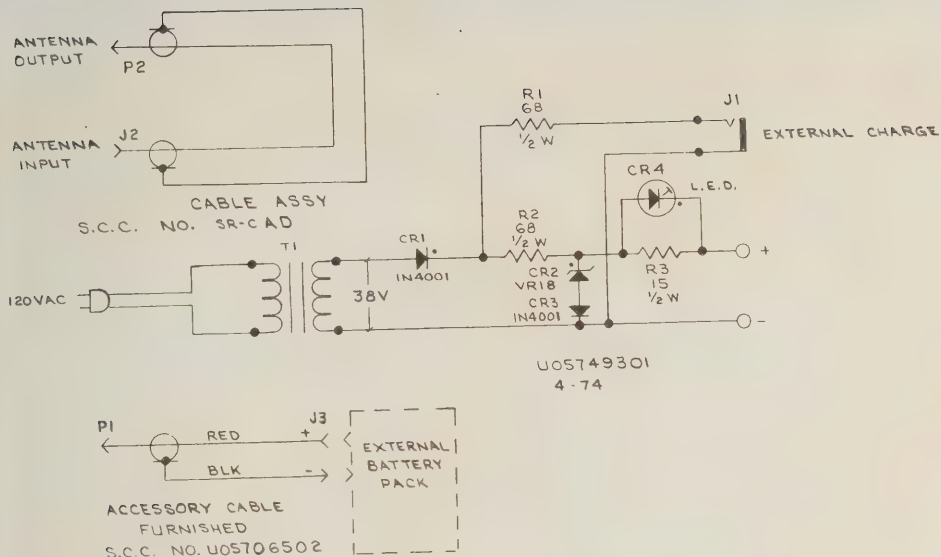


Figure 1: SCHEMATIC DIAGRAM sc-uSA-2
DESK TOP CHARGER

ELECTRICAL PARTS LIST - sc-uSA-2

CIRCUIT SYMBOL	DESCRIPTION	SCC PART #
CR1, CR3	Diode	1N4001
CR2	Diode - Zener	VR18
J1	Ultra - Miniature Receptacle	16PJ100
CR4	L.E.D. (Light Emitting Diode)	5082-4850
R1, R2	Resistor; 68 ohm; 1/2 W; $\pm 10\%$	
R3	Resistor; 15 ohm; 1/2 W; $\pm 10\%$	
T1	Transformer	U05727901
ACCESSORIES		
P2 - J2	Cable Assembly - ANT.	U05706501
P1 - J3	Cable Assembly - Battery Charger	U05706502
MECHANICAL PARTS		
	Housing	U05710501 - 1
	Bottom Cover	U05710501 - 2
	Contacts	N-114 - 3
	PWR Cord	14LC006

USA-2 HAND-HELD CHARGER SEMI-PERMANENT INSTALLATION

The enclosed adhesive-back sponge rubber pads can be installed on the four(4) legs of the USA-2 Charger, if a semi-permanent installation of this unit is required.

To install the sponge rubber pads perform the following:

1. Clean the bottom surface of each charger leg to remove all dirt grease or grime.
2. Remove the protective cover and emplace a sponge rubber disc on the mating round surface of each of the four charger legs.
3. Select a smooth horizontal location for the charger and clean this surface to remove all dirt, grime, or grease.
4. Remove the protective covers from the four sponge rubber pads and affix the charger in place.
5. If charger is re-located, use rubber cement to affix the pads on new surface.

Typical Charge Current/Terminal Voltage vs
Time for SA-2 Charger & BP-1 Battery Pack

Notes:

1. Battery completely discharged before start.
2. This is a typical curve. Substantial variations may be expected without indicating that the battery or charger is defective.
3. Battery pack used was the BP-1.
4. Charger used was the SA-2.
5. To test the SA-2, connect a 120 ohm resistor across the charging terminals. DC current thru the resistor should be between 45 and 55 ma.
6. Battery pack BP-1 is considered fully charged after 14 hours of recharging from a completely discharged condition.

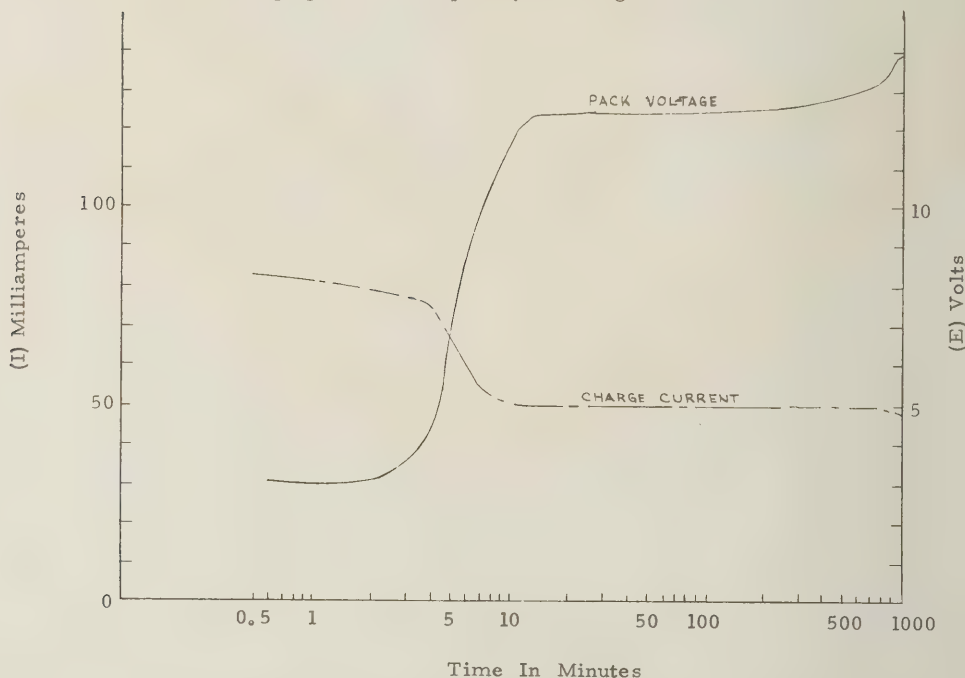
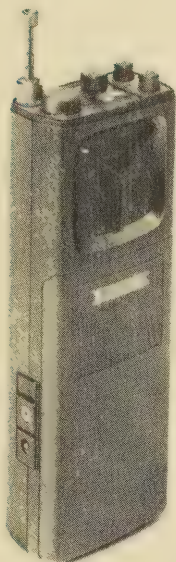


Figure 2: Charge Current/Terminal Voltage vs Time

AC

OWNER'S OPERATING MANUAL

HAND-HELD VHF/UHF FM TRANSCEIVER



C146A
C730L50
C830L30
C830S50



STANDARD COMMUNICATIONS CORP.

Limited Warranty

STANDARD COMMUNICATIONS CORP. (SCC) warrants each new radio product manufactured and/or supplied by it to be free from defects in material or workmanship under conditions of normal use and service. The SCC obligation under this warranty is limited to repairing or replacing, at its option, the radio product or part(s) therein, which upon examination by SCC are found to be defective or not up to the factory specifications, and contingent upon return of the radio product (transportation prepaid) to an authorized SCC FACTORY SERVICE CENTER.

SCC shall not be liable for any damages, consequential or otherwise, resulting from the use or operation of this radio product and makes no other warranty(s) either expressed or implied on this product, including any warranty of merchantability.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring (not our own), improper installation, or to use in violation of instructions furnished by us, not extended to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the equipment serial number has been removed, defaced, or changed, nor to accessories used therewith not of our own manufacture.

STANDARD COMMUNICATIONS CORP.

CUSTOMER RECORD

Purchase Date (Warranty Effectivity Date) 5-10-77

Purchase From Ham Radio Center - St. Louis, Mo

Equipment Model No. 3P-2142-A

Equipment Serial No. U 390560

Warranty Serial No. _____

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SCC HAND-HELD TRANSCEIVER DATA

GENERAL DATA	C146A	C730L50	C830L30	C830S50
RADIO USE	2 METER/FM	UHF/FM	VHF/FM	VHF/FM
CHANNELS	Amateur 5	Business/Industrial 5	Business/Industrial 3	Marine 5
Operating Frequency	143-149 MHz.	450-512 MHz.	148-174 MHz.	148-174 MHz.
TX Power (Nominal)	2 Watts	2 Watts	3 Watts	1 Watt

F.C.C. DATA	C146A	C730L50	C830L30	C830S50
TX Type Accept. No.	N/A	972	1271	172
Final Input Power	4 Watts	5.6 Watts	6 Watts	1.4 Watts
Frequency Tolerance	10 PPM	5 PPM	5 PPM	5 PPM
Type Emission	16F3	16F3	16F3	16F3
FCC Parts	15	21,89,91, 93,95A	21,81,89,91,93	21,81,83,89,91,93

INTRODUCTION

Your SCC Hand-Held Transceiver is an exceptionally dependable and versatile instrument. The design consists of all solid-state miniaturized components which have been selected for their rugged and reliable characteristics. With proper care, your transceiver will provide you with many years of trouble-free radio service.

SCC produces hand-held transceivers for many uses; mobile, marine, amateur, business, industrial, recreation, etc. The SCC transceivers operate in both the VHF and UHF frequency ranges and all employ frequency modulation (FM).

The communication range of your transceiver is dependent on a number of factors including; antenna height, output power, location, frequency, weather, etc. For this reason, the exact range you can expect is difficult to define.

INITIAL INSPECTION

Your transceiver was thoroughly tested and inspected at the SCC factory prior to shipment and delivery to you.

Upon receipt of your transceiver and its accessories, each item should be unpacked and examined for any noticeable damage or shortage which may have occurred in shipment. Any damage or shortage noted should be recorded on the freight bill or delivery receipt and, when possible, countersigned by the transportation agent. Submit the damage/shortage claim to the transportation company within 15 days of your transceiver delivery.

SERVICE

Your transceiver is warranted against defects for 180 days from original date of shipment from the factory. Under warranty, it will be repaired free-of-charge, providing it is returned (freight prepaid) to the SCC Customer Service Department. You may also obtain supplemental, warranty coverage for local repair service. See your local SCC Dealer for this type of service coverage.

SCC offers a "flat-rate" factory service plan for repairs to your transceiver after expiration of the warranty period. To obtain this service return the transceiver to your local SCC Dealer, who will repair the unit at the established flat-rate, or return it (freight prepaid) to the SCC Customer Service Department.

FCC RULES AND REGULATIONS

To operate the transmitter in your transceiver, you must comply with the Federal Communications Commission (FCC) Rules and Regulations. These rules and regulations apply to you and to anyone else who uses your transceiver.

A primary requirement is that you must have an approved license to transmit over the airways. It is your responsibility to apply for and obtain a radio license from the FCC. The SCC dealer, from whom you bought your transceiver, will assist you in all matters pertaining to obtaining a FCC license. Should you need additional assistance, please contact the SCC Customer Service Department.

CONTROLS AND CONNECTIONS

Note: See Figure 1

All controls for your hand-held transceiver are located at the top of the case, except for the "press-to-talk" switch is located at the side.

The function of the controls and connectors are listed below:

1. ON/OFF VOLUME CONTROL (VOL/OFF) - Applies power to the transceiver and adjusts audio (speaker) output level.
2. SQUELCH CONTROL (SQL) - Proper adjustment of this control reduces or eliminates the objectionable background noise (static) heard from the speaker.
3. PANEL METER - Indicates the battery voltage level when the "press-to-talk" switch is pressed. Acceptable voltage level is indicated by the red area.

NOTE: On the C146A Model the panel meter also indicates the signal strength of the received signal.

4. ANTENNA JACK (ANT) - Connection for external antenna.
5. MICROPHONE RECEPTACLE - Connection for external microphone.
6. COLLAPSIBLE ANTENNA - Extends for normal receive/transmit radio operation. Do not transmit without extending antenna, as damage to the transmitter output can occur.

NOTE: The SCC whip or flexible rubber antennas can easily be installed, for more versatile operation, by merely unscrewing and removing collapsible antenna.

7. TRANSMIT INDICATOR (RF) - Illuminates when in the "TRANSMIT" mode of operation.
8. CHANNEL SELECTOR (CH) - Selects the desired operating channel.

NOTE: SCC Hand-helds have 3, 4, or 5 operating channels depending on the model.

9. PRESS-TO-TALK SWITCH - When switch is pressed the radio is in the "Transmit" mode. When released, the radio reverts to the "RECEIVE" mode.
10. BATTERY CHARGER CONTACTS (Bottom) - Provides connection for external battery charger.
11. EXTERNAL POWER INPUT JACK - Provides connection for external power source.
12. EARPHONE JACK (EAR) - Connection for earphone for private listening or listening in noisy environment.
13. MICROPHONE/SPEAKER - The internal microphone and speaker are located behind the perforated grill on front of the transceiver.

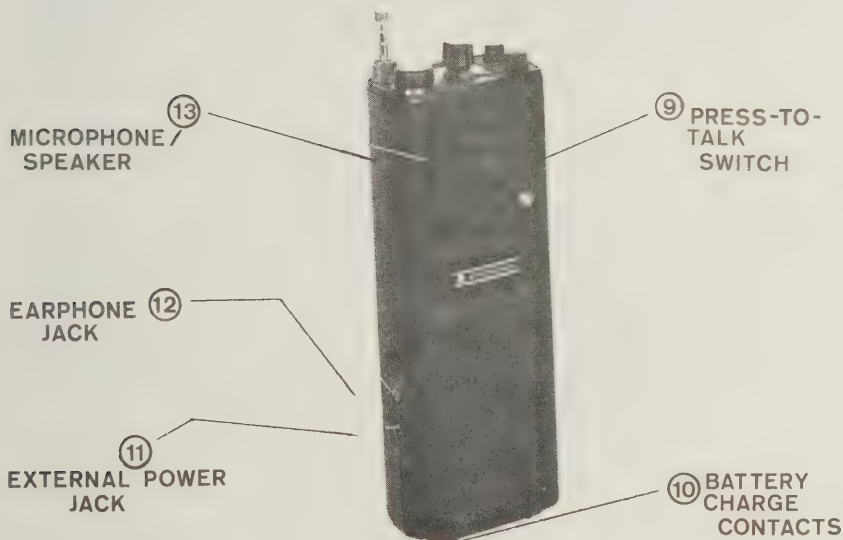
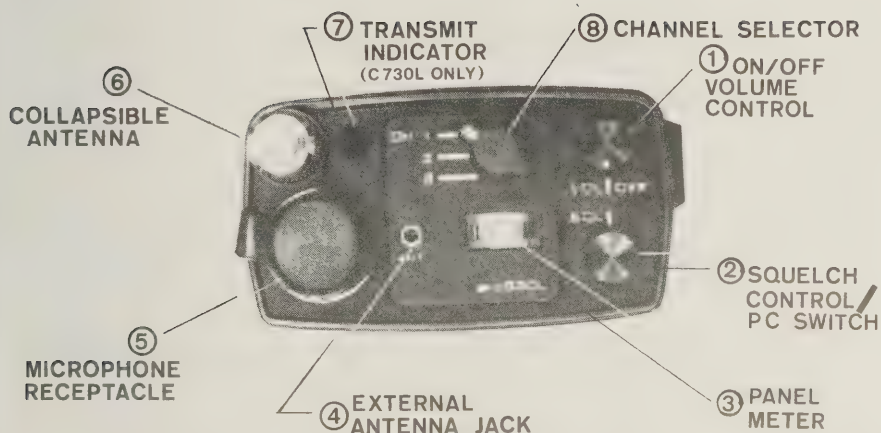


FIGURE 1. HANDHELD TRANSCEIVER CONTROLS & CONNECTIONS

OPERATING INSTRUCTION

Note: Before the transceiver can be operated batteries must be installed or the unit connected to an external power source.

1. Extend the antenna to its maximum height (collapsible types).
2. Rotate the VOL/OFF control clockwise beyond the detent "OFF" position.
3. Rotate the SQL control fully counter-clockwise but not to the point where "click" is heard.

NOTE: The extreme CCW "click" position cuts off the noise actuated squelch circuit when the transceiver is equipped with private channel accessory, such as, a TN103 or TN9.

4. Set the CH selector to the desired channel.
5. Adjust the SQL control clockwise until the background noise (static), heard over the speaker, just disappears. This is the proper squelch setting and the control should not be rotated beyond this point or receiver sensitivity will be degraded.
6. When a message is received, adjust the VOL control for the desired listening level.
7. When ready to transmit, push the "press-to-talk" switch and hold while you are transmitting. Speak slowly and distinctly into the speaker grill. The RF indicator will illuminate while you are transmitting.

NOTE: If your transceiver is equipped with an optional external microphone, its "press-to-talk" button will actuate the transmitter.

8. When you have finished transmitting your message, release the "press-to-talk" switch so incoming messages can be received.

NOTE: Your transceiver operates on "SIMPLEX" operation which means you should not transmit while a call is being received. Conversely, you cannot receive a call while you are transmitting.

PRIVATE CHANNEL OPERATION

Note: Private channel tone board is an optional device which is available at your SCC DEALER.

Private channel operation with your transceiver is comparable to a private line in telephone operation. With a private channel, your receiver functions (emits audible sound) only when messages are directed specifically to you. At all other times, your transceivers speaker will be muted, thus eliminating all unwanted "chatter" and noise on the airways.

This decoder function is the result of a specific tone code, transmitted by another transceiver in your system, which activates only your transceiver and similarly equipped transceivers in your systems.

Conversely, when you transmit in private channel operation an encoder in your transceiver will generate a specific tone code. This tone code is transmitted along with your message and will activate only those transceivers in your system which are equipped to receive the tone.

To operate your transceiver in private channel, the SQL control must be rotated fully counter-clockwise to the "click" or detent position.

BASE STATION OPERATION

The SCC hand-held transceivers can be operated as a base station in the same manner as mobile operation except the transceiver is normally placed in a SCC Model USA-2 Charger (optional accessory). It remains in this desk top unit at all times and is instantly ready for radio use.

Employing the transceiver in this mode eliminates the problems of continuously re-charging the batteries since they are automatically re-charged each time the transceiver is placed in the charger.

The SCC hand-held transceiver and the USA-2 Charger provides a very efficient and compact two-way radio/power supply base station operation.

HAND-HELD TRANSCEIVER POWER SOURCE

Note: Your transceiver does not have batteries installed when it is received. You can select the power source you require from the following information.

1. NI-CAD BATTERIES

The recommended power source for your transceiver is the re-chargeable NI-CAD battery. Your hand-held requires ten (10) of the size "AA", 1.2 volt NI-CAD cells (SCC P/N B0903002) or one (1) 12 volt NI-CAD Battery Pack (SCC P/N BP-2).

2. ALKALINE/MERCURY BATTERIES

Eight (8) non-rechargeable, size "AA", 1.5 Volt Alkaline Batteries can also be used in your transceiver. These should only be used in the C146A and C830S models. The current drain of the C730L is such that the life of these batteries will be very short.

NOTE: When operating with 1.5 Volt Batteries the two (2) dummy batteries, which are supplied with your transceiver, must be installed.

3. EXTERNAL POWER SOURCE

Your hand-held transceiver is equipped with an external power receptacle which can be connected to any 13.8 VDC (negative ground) power source. It is recommended that the SCC Model CMA Mobile Adaptor be installed if the power source is obtained from a vehicle generator.

NOTE: The SCC Model USA-2 Desk Top Charger can also be used to provide external power, in addition to maintaining a charge on NI-CAD batteries.

The external voltage must be maintained within the limits of 11 to 15 VDC for proper transceiver operation. Voltages in excess of 15 VDC can damage your radio unit.

BATTERY INSTALLATION/REPLACEMENT

Note: See Figure 2.

1. Press down on the indentation marked "OPEN" at the rear of the transceiver and remove the battery cover by sliding it, in the direction of the arrow, off of the case.
2. Lift out the battery pack and disconnect the battery terminal clip.
3. Install the batteries in the battery pack, observing the polarity markings.
NOTE: Inadvertent polarity reversal could damage the transceiver.
4. Reconnect the battery clip, install the battery pack in the transceiver, and replace the battery cover by sliding it back on to the case.

BATTERY CHARGING

The operational characteristics of nickel-cadmium (NI-CAD) batteries under load, are different than those of conventional alkaline or lead-acid batteries. A NI-CAD battery will maintain its voltage output level until near complete discharge, and then, the voltage will drop abruptly. For this reason, it is difficult to determine or estimate its state of charge.

A NI-CAD battery may be stored, either charged or discharged, with no detrimental effect. If a battery is to be used after a prolonged storage period, it should be initially charged for 14 to 16 hours at the normal charge rate, then placed on reduced or trickle charge until placed in operation.

The batteries in the transceiver must be charged through the contacts in the bottom of the case.

The SCC Model USA-2 and Model 12/120-6 Battery Chargers are designed specifically for the hand-held transceiver battery requirements. Instructions for charging your NI-CAD batteries are included with the battery charger.

A NI-CAD battery can be charged in excess of 500 times and will provide 8 hours of normal operation for each 14 hours of charge.

NOTE: Battery life (discharge time) is dependent on how you use your transceiver. If the volume is constantly on maximum, the squelch off, and if you transmit more or less continuously, this time can be reduced to approximately two hours.



Figure 2: REMOVAL OF BATTERY COVER

CRYSTAL/OPERATING FREQUENCY INFORMATION

To be able to transmit with your hand-held transceiver you must apply for and obtain an FCC license. At the time your license is issued, the FCC will assign the operating frequencies for your transceiver. The assigned operating frequencies will be within the frequency range of your transceiver.

The key to be able to transmit and receive on a specific operating frequency is the crystal. Each channel in your transceiver will be assigned a specific frequency and each will require a special crystal. A separate crystal is also required for both receiver and transmitter operation. Accordingly, if your transceiver has five operating channels, it will have five receiver and five transmitting crystals.

The crystals are plug-in type modules which can be easily installed or replaced. You can install, change or add crystals to your transceiver at relatively small expense. However, any crystal change which changes the operating frequency of your transceiver must be in accordance with FCC regulations.

The above provides a brief insight on the crystals and operating frequency of your transceiver. Your SCC Dealer will take care of all of your crystal needs and will answer all questions relative to the crystal/operating frequency of your radio unit. He will also assist you in all matters pertaining to FCC licensing. In addition, the SCC service information will provide specific crystal information for your particular model transceiver.

MAINTENANCE AND CARE

Discounting the need to periodically recharge or change batteries, your SCC transceiver requires practically no routine maintenance. Proper care and good judgment in using the transceiver will insure that its life is long and useful. The following guideline will assist you in maintaining your transceiver in peak performance.

1. Avoid operating your transceiver on supply voltages less than 11 VDC or more than 15 VDC. High supply voltage is a common cause for transceiver failure.
2. Get in the habit of monitoring your battery voltage, as noted on the panel meter, each time you transmit. When the indicator reads out of the red zone, recharge the batteries.
3. Do not energize the transmitter when the antenna is disconnected or if any visible defects are noted on the antenna or its interconnecting cable.
4. Protect your transceiver from exposure to water spray, rain or inclement weather condition.
5. Have a FCC licensed technician check the transceiver and its operating antenna at least once a year. Items to be checked are transmitter frequency, deviation and power output.

ACCESSORIES

The following optional accessories for your hand-held transceiver are available at all SCC Dealers.

AT12	ANTENNA, flexible steel whip for VHF application.
AT19	ANTENNA, flexible rubber for VHF application.
AT21	ANTENNA VHF/UHF, with gutter clip for mobile installation. Includes 8' cable with connector.
AT51	ANTENNA, UHF telescoping, designed specifically for 450-470 MHz range.
AT51Hi	ANTENNA, UHF telescoping, designed specifically for 470-490 MHz range.
AT52	ANTENNA, flexible rubber for UHF application.
USA-2	BATTERY CHARGER, desk type, provides two charge rates and includes provision for base station antenna connection. Operates on 120 VAC/60 cycle power.
12/120-6	BATTERY CHARGER, wall mounted. Operates on 120 VAC/60 cycle power.
B0903002	BATTERY, NI-CAD, "AA" size cell, 1.2 volts, rechargeable. (Ten required per transceiver).
BP-2	BATTERY PACK, NI-CAD, 12 VDC, completely encapsulated (One required per transceiver).
PT3644	CARRYING CASE, leather.
LCC-1	CARRYING CASE, leather, heavy-duty.
MP08	MICROPHONE, miniature external with coiled extension cord.
MP10	MICROPHONE/SPEAKER, external with coiled extension cord.
*TN-5	TONE BOARD, encoder, tone burst.
*TN101	TONE BOARD, private channel, encoder.
*TN103	TONE BOARD, private channel, encoder/decoder.
*TT-1	TOUCH TONE, encoder.
*NOTE: Contact your SCC Dealer for complete information on the installation of tone boards in your transceiver.	
CAD	CABLE ADAPTOR, adapts external antenna to H/H transceiver.
CMA	POWER ADAPTOR, adapts the H/H transceiver to mobile application using external power and antenna inputs.
A00416008	KIT, Microphone Clip. Kit contains hardware to mount external mike on LCC-1 carrying case.

SPECIAL NOTICE

The location of the internal microphone in all hand-held transceivers is directly behind the lower left-hand corner of the speaker grill. If, when using the microphone, the operator speaks into the upper right-hand corner of the speaker, an acoustics problem is created which results in distorted and/or attenuated voice communications. This primarily due to the voice waves being deflected by the "Y" shaped grill protector and not reaching the microphone.

This problem can be simply alleviated by talking directly into the microphone at the lower left-hand corner of the speaker grill.



FIGURE 3: INTERNAL MICROPHONE LOCATION



STANDARD COMMUNICATIONS CORP.

HH56303 1/76



STANDARD COMMUNICATIONS CORP.

INFORMATION BULLETIN #101 R1
Date: 16 Sept. 1975

PRIVATE CHANNEL OPERATING INFORMATION IF YOUR RADIO
IS EQUIPPED WITH PRIVATE CHANNEL (CTCSS) FACILITIES

Mobile and Base Units:

To activate the receiver mute feature when using a mobile microphone, it is necessary to provide an electrical return path from the microphone hanger button to the radio. This can be accomplished by mounting both the radio and the microphone hanger bracket to a common metal member or a wire from the microphone clip to the radio ground. When the microphone is then secured in its hanger, the Private Channel receiver mute will be activated. The MP05 Base Station Microphone automatically activates the Private Channel receiver mute unless the "SPKR" lever is pressed. Some base and mobile units are provided with a tone toggle switch. If this switch is not in the "ON" position, the Private Channel receiver mute cannot be activated.

Portable Units:

Portable units and Half-Pack mobile units are provided with a switch position associated with the squelch control marked "PC". Please note that in the standard configuration this switch has no function. To activate the Private Channel receiver mute, the microphone hanger button must be electrically connected to the radio as in the mobile and base units.

Hand-Held Units:

Hand-Held units are not provided with an automatic Private Channel receiver mute circuit, even though a remote microphone may be used. The Private Channel receiver mute is activated by rotating the squelch control (CCW) into the "PC" position. You must rotate the squelch (CW) out of this switch position to deactivate the Private Channel receiver mute circuit in all units.

NOTE: In all units except the 809/859 series, the Private Channel tone encoder is always automatically activated when the transmitter is energized. In the 809L and 859L with normal connections, the tone encoder is switched out of the circuit in the disabled Private Channel mode. This feature can be modified so that only the receiver decoder will be disabled. See SCC Unit Modification Instruction #34 for the instructions to perform this modification.

CE INFORMATION

SCC MODEL NO.	PRELIMINARY INSTRUCTION	INSTRUCTION SHEET		INSTRUCTION MANUAL	ALIGNMT. TEST CHART	PUBL. CODE	QTY	TOTAL PRICE
		A	B					
MARINE								
*80				\$3.00		832		
*801S				7.00		849D		
*801SA	Also order 801S INSTRUCTION MANUAL			Supplement: \$1.50		849E		
*802S	\$2.00					804		
*805BZ	2.00					831		
807S12		\$1.00	\$1.00			201		
*811S				3.00		849G		
830S05		1.00	1.00			202		
850Z		1.00	TBI		.25	208		
*851S				3.00		849I		
*852S12A	3.00					820		
852S12B		A1:\$1.00/A2:\$1.00			.25	204		
HORIZON 25		1.00	TBI		.25	210		
*880S12A	3.00					821		
*880S12B		1.00	1.00			830		
890S12B		1.00	TBI		.25	211		
AMATEUR								
*14/14U				3.00		849C		
*146		\$1.00-Also order 146A PRELIMINARY INSTRUCTION MANUAL				849M		
146A	3.00					231		
*806M				3.00		849F		
*826M	3.00					849H		
826MA				3.00		232		
HORIZON 2	3.00					237		
PAGERS								
740Z (UHF)		1.00	1.00			263		
840Z (VHF)		1.00	1.00			261		
CITIZENS BAND								
HORIZON 29	(FOTO-FACTS MANUAL)			3.00		007		
HORIZON 29A				TBI		014		
HORIZON 2900				TBI		013		

S INFORMATION

Both publications can be ordered below:

Publication	Code	Price Ea.	QTY	TOTAL
FM MAINTENANCE PRIMER	AJ	\$2.00		
MARINE RADIO FACT BOOK	AN	\$3.00		

SCC RADIO SERVICE INFORMATION

SCC MODEL NO.	PRELIMINARY INSTRUCTION	INSTRUCTION SHEET		INSTRUCTION MANUAL	ALIGNMT. TEST CHART	PUBL. CODE	QTY	TOTAL PRICE
		A	B					
LAND/MOBILE								
UHF MODELS:								
703L01				\$3.00	\$.25	151		
703L04	\$3.00				.25	174		
703L12		\$1.00	TB1		.25	154		
703TR		1.50	TB1		.25	173		
707L04		1.00	\$1.00			157		
712L04		1.00	1.00			160		
730L05		1.00	1.00			163		
751L02		1.00	1.50			167		
751L12		1.00	1.50			170		
790L01		1.00	TB1			178		
790L04		1.00	TB1			181		
VHF MODELS:								
*803L				7.00		828		
*803LA	Also order 803L INSTRUCTION MANUAL			Supplement: \$3.00		828A		
*803L01	Also order 803L INSTRUCTION MANUAL			Supplement: 1.50		828B		
803L12	Also order 803L INSTRUCTION MANUAL			Supplement: 1.50		103		
807L12	Order 807S12 Instruction Sheets					112		
809L01	A1:\$1.00/A2:\$1.00/B1:\$1.00/B2:\$1.00					102		
809L12	A1:\$1.00/A2:\$1.00/B1:\$1.00/B2:\$1.00					102		
809DTR	2.00	Also Order 809L12 "A" & "B" Sheets				120		
812L04		1.00	1.00			109		
830L03		1.00	1.00		.25	110		
*851T01		1.00	1.00			819		
*851T12		1.00	1.00			829		
851TR	2.00					111		
859L01	A1:\$1.00/A2:\$1.00/B1:\$1.00/B2:\$1.00					102		
859L12	A1:\$1.00/A2:\$1.00/B1:\$1.00/B2:\$1.00					102		
890L01		1.00	1.00		.25	113		
890L02	2.00	Also order 890L01 "A" & "B" Sheets			.25	119		
890L12		1.00	TB1		.25	121		
REPEATERS								
RPT-1 (VHF)				3.00		251		
RPT-2 (UHF)	A1:\$1.00/A2:\$1.00	1.00	1.00			191		
RPT-3 (VHF)		1.00	1.00			192		

*ITEM NO LONGER IN PRODUCTION
TB1 - TO BE ISSUED

MISCELLANEOUS INFORMATION

In addition to the service publications listed herein for each transceiver model, SCC publishes an FM MAINTENANCE PRIMER (publication Code: AJ). The primary purpose of this publication is to provide the reader with an understanding of the basic approach which should be used in performing maintenance on SCC transceivers. Secondly it forms the basis for the maintenance and test format which will be used in all future SCC service information.

SCC also publishes a MARINE RADIO FACT BOOK which gives general information, specifications, and comparisons of the various SCC FM Marine Transceivers.

Both publications can be ordered below:

Publication	Code	Price Ea.	QTY	TOTAL
FM MAINTENANCE PRIMER	AJ	\$2.00		
MARINE RADIO FACT BOOK	AN	\$3.00		



Standard Communications Corp.

SERVICE INFORMATION ORDER FORM

NOTE

- Please circle the service information items you require and indicate quantity required in the QTY. column.
- Enclose Check or Money Order to STANDARD COMMUNICATIONS CORP. for total amount of order. Price per item includes handling and shipping.
- If publication is out of stock, it will be sent when available.

INSTRUCTION SHEET: "A" & "B" sheets contain schematic diagrams, printed circuit layouts, parts lists and general information. "B" sheets contain theory of operation, installation and maintenance procedures.

INSTRUCTION MANUALS: All inclusive service manuals containing the same information is listed for INSTRUCTION SHEETS.

PRELIMINARY INSTRUCTION: Advanced technical instruction containing, basically, the same information listed for the INSTRUCTION SHEETS.

ACCESSORY INSTRUCTIONS: Contain the instruction required to install, operate and service the unit.

Please send material to:

NAME/COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ATTN. _____

ORDER ENTERED BY _____

Enclosed is Check/Money Order for \$ _____
or enter P.O. # (SCC Dealers)

Return this order to:

CUSTOMER SERVICE MANAGER
Standard Communications Corp.
P.O. Box 92151
Los Angeles, CA 90009



Standard Communications Corp.

SERVICE INFORMATION ORDER FORM

NOTE

1. Please circle the service information items you require and indicate quantity required in the QTY. column.
2. Enclose Check or Money Order to STANDARD COMMUNICATIONS CORP. for total amount of order. Price per item includes handling and shipping.
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INSTRUCTION MANUALS All inclusive service manuals containing the same information is listed for INSTRUCTION SHEETS.

PRELIMINARY INSTRUCTION Advanced technical instruction containing, basically, the same information listed for the INSTRUCTION SHEETS.

ACCESSORY INSTRUCTIONS Contain the instruction required to install, operate and service the unit.

Please send material to:

NAME/COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ATTN. _____

ORDER ENTERED BY _____

Enclosed is Check/Money Order for \$ _____
or enter P.O. # (SCC Dealers)

Return this order to:

CUSTOMER SERVICE MANAGER
Standard Communications Corp.
P.O. Box 92151
Los Angeles, CA 90009

SR-C146A

Ser # 206069

HAND-HELD TRANSCEIVER



INSTRUCTIONS



STANDARD COMMUNICATIONS CORP.

SCC ACCESSORY SERVICE INFORMATION

SCC MODEL NO.	DESCRIPTION	PUBLICATION FORMAT	PRICE EACH	PUBL CODE	QTY.	TOTAL PRICE
2015	Speaker	Instruction Sheet	\$.25	401		
A00416005	Handset Hanger Mounting Kit	Instruction Sheet	.25	BA		
A00416008	Microphone Clip	Instruction Sheet	.25	340		
A00449016	C852S Stacking Kit	Instruction Sheet	.25	702		
A00449017	C809/859L Stacking Kit	Instruction Sheet	.25	702		
A00449018	Lock Screw Kit	Instruction Sheet	.25	704		
A00449010	Lock Screw Kit	Instruction Sheet	.25	705		
A00449024	Telephone Mounting Kit	Instruction Sheet	.50	BB		
*AL25A	Paging Encoder (Bramco)	Service Reference	N/C	815		
A130	Paging Encoder (Comex)	Instruction Sheet	.25	291		
AL90	Paging Encoder (Comex)	Instruction Sheet	.25	292		
*AL100A	Paging Encoder (Bramco)	Service Reference	N/C	814		
AT05	Antenna	Frequency Cutting Chart	.25	BH		
AT06	Whip Antenna	Instruction Sheet	.25	586		
AT16	Right Angle Whip Antenna	Frequency Cutting Chart	.25	608		
AT19	H/H Rubber Antenna (VHF)	Frequency Cutting Chart	.25	329		
*ATBE-1	Tone Burst Encoder	Instruction Manual	1.00	812		
BP-2	Ni-Cad Battery Pack	Service Reference	N/C	341		
BP-3	Ni-Cad Battery Pack (Intrins.Safe)	Service Reference	N/C	344		
BP-4	Ni-Cad Battery Pack	Service Reference	N/C	341		
BP-5	Ni-Cad Battery Pack	Service Reference	N/C	341		
C6/120-10	Pager Battery Charger	Instruction Manual	.25	293		
C12/24-1	DC Converter	Schematic	.25	477		
C12/32-1	DC Converter	Schematic	.25	477		
C12/120-1A	AC Power Supply	Instruction Manual	1.00	849T		
C12/120-1B	AC Power Supply	Instruction Manual	1.00	471		
*C12/120-4	Power Supply	Schematic	.25	849A		
C12/120-5	AC Power Supply	Instruction Manual	1.00	472		
C12/120-5R	AC Power Supply	Instruction Manual	1.00	472		
C12/120-6	Battery Charger	Instruction Sheet	.25	324		
C12/120-6D	Battery Charger	Instruction Sheet	.25	706		
*C12/120-20	Power Supply	Preliminary Instruction	.50	849B		
C12/120-20A	Power Supply	Schematic	.25	486		
CMA	Antenna Adapter	Instruction Sheet	.50	323		
*CSA	Base Station Battery Charter	Instruction Manual	.50	8490		
DCM-1	VSHR Meter	Instruction Sheet	.25	725		
DH-12	Telephone Control Head	Schematic/P.C. Board	.25	722		
DPX-1	Duplexer (Phelps-Dodge)	Service Reference	N/C	662		
DPX-2	Duplexer (Sinclair)	Service Reference	N/C	632		
DPX-3	Duplexer (Phelps-Dodge)	Service Reference	N/C	683		
DPX-4	Duplexer (Phelps-Dodge)	Service Reference	N/C	697		
DPX-5	Duplexer (Phelps-Dodge)	Service Reference	N/C	698		
DPX-10	Duplexer (Phelps-Dodge)	Service Reference	N/C	720		
EC1	Extension Cable	Instruction Sheet	.25	666		
FBK-830	Drop-in Battery Tray	Installation Instruction	.25	346		
*FGB	Intervalometer	Instruction Manual	1.00	817		
FZK-4651	Reverse Lettering Mount	Instruction Sheet	.25	BE		
GC1	Master Charger	Schematic	.25	295		
GC2	Slave Charger	Schematic	.25	296		
GCA	Croup Call Adapter	Instruction Manual	1.00	297		

SCC MODEL NO.	DESCRIPTION	PUBLICATION FORMAT	PRICE EACH	PUBL CODE	QTY.	TOTAL PRICE
*HHC-1	Hand/Held Charger	Instruction Sheet	\$.50	810		
HPF	High Pass Filter	Preliminary Instruction	1.00	678		
*L25	VHF Power Amplifier	Schematic	.25	802		
*L25-1	UHF Power Amplifier	Service Reference	N/C	839		
*L25-2	Power Amplifier	Service Reference	N/C	840		
*L25-3	Power Amplifier	Instruction Manual	1.00	827		
*L25-4	VHF Power Amplifier	Preliminary Instruction	1.00	801		
*L25-5A	Power Amplifier	Service Reference	N/C	838		
*L60-1	Power Booster	Service Reference	N/C	833		
*L60H-1	Power Booster	Instruction Manual	2.00	461		
*LCE-1	Channel Element	Schematic	.25	872		
LF06	Line Filter	Instruction Sheet	.25	483		
LH25-1	UHF Power Amplifier	Instruction Manual	1.00	462		
LH25-2	VHF Power Amplifier	Instruction Manual	1.00	461		
LH25-5A	UHF Power Amplifier	Instruction Manual	1.00	462		
LTH-7	Telephone Control Head	Instruction Manual	1.00	850C		
LTH-11	Telephone Control Head	Instruction Manual	1.00	850C		
LTH-12	Telephone Control Head	Instruction Manual	1.00	850C		
MFTP-1	Test Panel	Instruction Manual	1.00	668		
MNM-1	Antenna Mount	Instruction Sheet	.25	606		
*MP01	Microphone	Schematic	.25	807		
MP02	Telephone Handset	Instruction Sheet	.50	551		
MP02A	Telephone Handset	Instruction Sheet	.50	551		
MP02AW	Telephone Handset	Instruction Sheet	.50	551		
MP02W	Telephone Handset	Instruction Sheet	.50	551		
*MP04	Microphone	Schematic	.25	808		
MP05	Desk Microphone	Instruction Sheet	.50	553		
MP05A	Desk Microphone	Instruction Sheet	.50	553		
*MP06	Telephone Handset Assembly	Schematic	.25	552		
*MP06A	Telephone Handset Assembly	Schematic	.25	567		
MP08	Miniature Microphone	Instruction Sheet	.50	331		
MP09	Noise Cancelling Microphone	Instruction Sheet	.50	554		
MP09A	Noise Cancelling Microphone	Instruction Sheet	.50	554		
MP10	Speaker/Microphone	Instruction Sheet	.50	555		
MP20	Speaker/Microphone	Instruction Sheet	.50	556		
MP20A	Speaker/Microphone	Instruction Sheet	.50	556		
MP22	Microphone	Instruction Sheet	.50	557		
MP22A	Microphone	Instruction Sheet	.50	558		
*MP22B	Microphone	Schematic	.25	841		
MP22C	Microphone	Instruction Sheet	.50	560		
MP40	Microphone	Instruction Sheet	.50	562		
MP42	Microphone	Instruction Sheet	.50	564		
MP60	Mobile Telephone Console	Instruction Sheet	.50	576		
MP60A	Mobile Telephone Console	Instruction Sheet	.50	576		
MP60W	Mobile Telephone Console	Instruction Sheet	.50	576		
MP60AW	Mobile Telephone Console	Instruction Sheet	.50	576		
MTA-1	Multiple Tone Panel	Schematic	.25	687		
*MTP-1	Multiple Tone Panel	Schematic	.25	850B		
MTP-1A	Multiple Tone Panel	Schematic/P.C. Board	.25	671		
MVC-1	DC Converter	Instruction Manual	1.00	478		
PE01	Paging Encoder (Hand/Held)	Instruction Manual	1.00	300		
PE-2	Paging Encoder (Hand/Held)	Instruction Manual	1.00	301		
PH06B	Microphone Hanger Assembly	Instruction Sheet	.50	572		
PH06BA	Microphone Hanger Assembly	Instruction Sheet	.50	572		
PH06BW	Microphone Hanger Assembly	Instruction Sheet	.50	572		
PH-1	Telephone Hanger	Installation Instruction	.25	677		
PS-1	AC Power Supply	Instruction Manual	1.00	481		
*PS-2	Power Supply	Schematic	.25	849B		
PS-2A	Power Supply	Schematic	.25	485		

SCC MODEL NO.	DESCRIPTION	PUBLICATION FORMAT	PRICE EACH	PUBL CODE	QTY.	TOTAL PRICE
PS-2B	Power Supply	Schematic	\$.25	488		
PSD-1	AC Power Supply	Preliminary Instruction	1.00	479		
PSD-1A22	AC Power Supply	Preliminary Instruction	1.00	489		
PSM-1	AC Power Supply	Instruction Manual	1.00	473		
PSM-1A	AC Power Supply	Instruction Manual	1.00	473		
PSM-1AR	AC Power Supply	Instruction Manual	1.00	473		
PSM-1R	AC Power Supply	Instruction Manual	1.00	473		
PT-1	Pager Test Panel	Preliminary Instruction	1.00	667		
RA-1	Recording Adapter	Instruction Manual	1.00	710		
RA-1A	Recording Adapter	Instruction Manual	1.00	710		
RC01-1	Remote Control Station	Instruction Manual	1.00	653		
*RC01-2	Remote Control Station	Instruction Manual	2.00	8490		
RC01-3	Remote Control Adapter	Instruction Manual	1.00	709		
RC04	Remote Control Station	Schematic	.25	652		
RCU-1	Remote Control Unit	Preliminary Instruction	1.00	676		
REU-1	Remote Extension Unit	Preliminary Instruction	1.00	690		
RTU-1	Remote Terminal Unit	Preliminary Instruction	1.00	679		
*RPA 5/25W	UHF Power Amplifier	Service Reference	N/C	834		
*RPA 5/60W	UHF Power Amplifier	Service Reference	N/C	835		
*RPA 10/60W	VHF Power Amplifier	Service Reference	N/C	836		
*RPA 10/100W	VHF Power Amplifier	Service Reference	N/C	837		
RPAH 5/25W	UHF Power Amplifier	Instruction Manual	1.00	462		
RPAH 5/60W	UHF Power Amplifier	Instruction Manual	1.00	462		
RPAH 10/60W	VHF Power Amplifier	Instruction Manual	1.00	461		
RPAH 10/100W	VHF Power Amplifiers	Instruction Manual	1.00	465		
TD-1 thru TD-12	Ringer Boards	Instruction Manual	1.00	433		
*TD-1d thru*TD-9d	Ringer Boards	Instruction Manual	1.00	850A		
TE-2	Tone Expander	Schematic/P.C. Board	.25	706		
*TN2	P.C. Encoder/Decoder	Preliminary Instruction	1.00	824		
TN2R	P.C. Encoder/Decoder	Schematic/P.C. Board	.25	438		
*TN3	P.C. Encoder/Decoder	Preliminary Instruction	.50	825		
*TN3A	P.C. Encoder/Decoder	Schematic/P.C. Board	.25	826		
TN5	Tone Bust Encoder	Preliminary Instruction	1.00	429		
TN9	P.C. Encoder/Decoder	Preliminary Instruction	2.00	435		
TN10	P.C. Encoder/Decoder	Preliminary Instruction	2.00	435		
TN50	Two Tone Decoder	Instruction Manual	1.00	424		
TN50A	Two Tone Decoder	Schematic/P.C. Board	.25	424A		
*TN51	Two Tone Decoder	Schematic/P.C. Board	.25	425		
TN51A	Two Tone Decoder	Preliminary Instruction	1.00	425A		
*TN52	Two Tone Decoder	Schematic	.25	849Z		
TN52A	Two Tone Decoder	Preliminary Instruction	1.00	425A		
TN101	P.C. Encoder	Schematic/P.C. Board	.25	426		
TN101-A	P.C. Encoder	Schematic/P.C. Board	.25	449		
TN102-A	P.C. Encoder/Decoder	Preliminary Instruction	2.00	427		
TN103-A	P.C. Encoder/Decoder	Preliminary Instruction	2.00	427		
*TS1028	Pager Tester	Preliminary Instruction	.50	849S		
TT-1	Touch-Call Encoder	Preliminary Instruction	1.00	339		
TT-2	Touch-Call Encoder	Instruction Sheet	.25	726		
TTE-3	Touch-Call Encoder	Instruction Sheet	.25	727		
U02616001	Speaker Hanger Bracket	Installation Instruction	.25	BF		
U1355100	Stacking Bracket Kit	Installation Instruction		703A		
UAD	Cable Adapter	Instruction Sheet	.25	325		
URM	Range Calculator	Instruction Manual	1.00	692		
USA-2	Charger (Hand/Held)	Instruction Manual	1.00	338		
USA-10	Charger (High-Speed)	Instruction Sheet	.50	348		
XF-1	Crystal Filter	Instruction Sheet "A"	1.00	484		

*Item no longer in production

SR-C146A

Ser # 206069

HAND-HELD TRANSCEIVER



INSTRUCTIONS



STANDARD COMMUNICATIONS CORP.

SR-C146A 2 METER HAND-HELD TRANSCEIVER

DESCRIPTION

The SR-C146A is a compact 5 channel hand-held solid state FM transceiver for use in the 143 - 149 MHz range (2 MHz spread without retuning). It is designed to operate from an internal battery supply of 12V DC or from an external source of D.C., not to exceed the limits of 10-15 volts.

The unit contains provisions for:

1. Connection of remote mike (MP08) or speaker/mike (MP10) or speaker (C202K with 10 Ohms in series).
2. Connection of an earphone.
3. Connection of an external antenna.
4. External 12V power source.
5. Insertion into the CSA Ni-Cad battery charger.
6. Replacement of the telescoping antenna with a flexible rubber antenna (AT-19) or flexible steel whip (AT-12).

A simulated leather carrying case with shoulder belt straps is available (PT-3644). The unit also contains a meter, which indicates relative signal strength when in the receive mode, and input voltage (battery condition) in the transmit mode.

SPECIFICATIONS

General

Frequency - 143 to 149 MHz
(2 MHz spread)

Channels - 5; Supplied with
(1) 146.94 simplex
(2) 146.34/146.94

Receiver

Sensitivity - 0.4 or less
microvolts for 20dB quieting

Sequelch sensitivity -
Threshold 0.2 microvolts or
less

SPECIFICATIONS (CONT.)General

Circuitry - 29 transistors,
2 IC's, 13 diodes

Speaker - Internal 2" dynamic

Microphone - separate Dynamic type,
internally located

Power supply - 10 "AA" size
alkaline 1 1/2V, or 10 "AA"
size 1.2V Ni-Cads

Current consumption at 12.5V
DC - 15mA standby, 620mA transmit

Weight - 24 oz. without
batteries

Dimensions-8"h x 3"w x
1 1/2"d

Construction - Di-cast metal
chassis with hi-impact cycloac
case

Plug in provision for tone squelch with
CTN-3

Receiver

Maximum (tight) - Between 20 dB
quieting sensitivity and 20 dB
quieting plus 10 dB

Deviation acceptance - Up to
 ± 15 KHz deviation

Adjacent channel selectivity -
(30 KHz channels) 60 dB
attenuation of adjacent channel

Spurious and image attenuation -
50 dB below the desired signal
threshold sensitivity

Type of receiver - Dual conversion
superheterodyne, first I.F.
11.7 MHz, second I.F. 455 KHz

Basic Crystal frequency - $f_o = 11.7$
(MHz) 9

where f_o =operating frequency
in MHz (Purchase from SCC only)

Transmitter

RF Output - 2 watt minimum

Frequency stability - $\pm .001\%$
(-30° to +50°C)

Deviation - Preset ± 7 KHz,
internally adjustable to ± 15 KHz

Spurious and harmonic - 50dB
below carrier level

SPECIFICATIONS (CONT.)

Transmitter

Audio roll off above 3 KHz-16dB/
octave, 6dB/octave pre-emphasis

Method of generating FM - Phase
modulated

Basic Crystal frequency = $\frac{f_o}{18}$

(MHz)

operating frequency in MHz (Purchase from SCC only)

INSTALLATION

The unit can be used for portable, mobile, or base applications.

1. Portable - Uses own internal battery supply which consists of either of the following:

10 - "AA" size alkaline 1.5V cells or -

10 - "AA" size Ni-Cad 1.2V cells

2. Mobile - Use the model CMA mobile adapter. This unit permits connecting an external antenna and voltage (+12V DC) source - usually the automobile battery: The MP08 microphone may be used if desired, or the transceiver itself may be held in a normal manner. Caution - Steps must be taken to limit the maximum input voltage to 13V DC if not using the CMA mobile adapter. Refer to the instruction sheet supplied with the CMA.

INSTALLATION (CONT.)

3. Desk Top Operation - Use the Standard model CSA desk top charger and AC adapter. The CSA includes a jumper cable to plug into the antenna jack on top of the SR-C146A. Provision is made on the side to connect an external base antenna.

OPERATION

The controls and connections that are located on the top of the unit are as follows:

Squelch (SQL) Control - Adjusts threshold point for "noise actuated" squelch circuit. Adjust when no signal present to quiet receiver. Switches receiver tone squelch on/off. Volume/off (Vol/Off) control - Adjusts audio output level and turns unit "on" or "off".

Channel Selector (CH) - Selects desired channel. Channel 1-146.94 transmit/146.94 receive. Channel 2 - 146.34 transmit/146.94 receive. These are factory installed. Three additional channels may be installed with plug-in crystals.

Meter - Indicates battery condition on transmit (proper voltage indicated by red area) and relative signal strength on receive.

OPERATION (CONT.)

Antenna (ANT) - For connection of an external antenna.

Automatically disconnects the whip antenna in the radio.

External Mike/Speaker - Remove rubber cover over connector to connect MP08 or speaker/mike MP10.

Telescoping Whip Antenna- Always use extended out to fullest length. Model AT-19 flexible rubber antenna or AT-12 steel whip may also be used by simply unscrewing the whip.

P.T.T. - "Push-to-Talk" switch, located on the side, actuates the transmitter.

Other connections on the side of the transceiver include provision for connecting an external earphone and external +12V DC power source. This power source must not exceed 15V DC with a noise component not to exceed 0.1V peak-to-peak. When connecting to a 12V DC automobile power system, the following steps should be taken if you are not using the CMA mobile adapter:

1. Insert a LF06 line filter, or equivalent, in series with the power input to reduce alternator whine and other noises.
2. Insert a sufficient number of power diodes (1 amp rating) in series with power input to reduce the D.C. at the 146A to 15V DC when the alternator/generator is developing maximum voltage. Alternate methods of protection may be used to limit the input voltage to 13.8V DC.
3. Instructions contained with the CMA define its application. The CMA unit has the CF06 built in to it.

SR-C





OPERATION (CONT.)

TONE CODED SQUELCH

With the addition of the optional CTN-3, continuous tone squelched systems may be activated. When installed, the tone is continuous on transmit. On receive, the decoder may be activated by the switch located on the squelch control. Connectors are provided to facilitate installation.

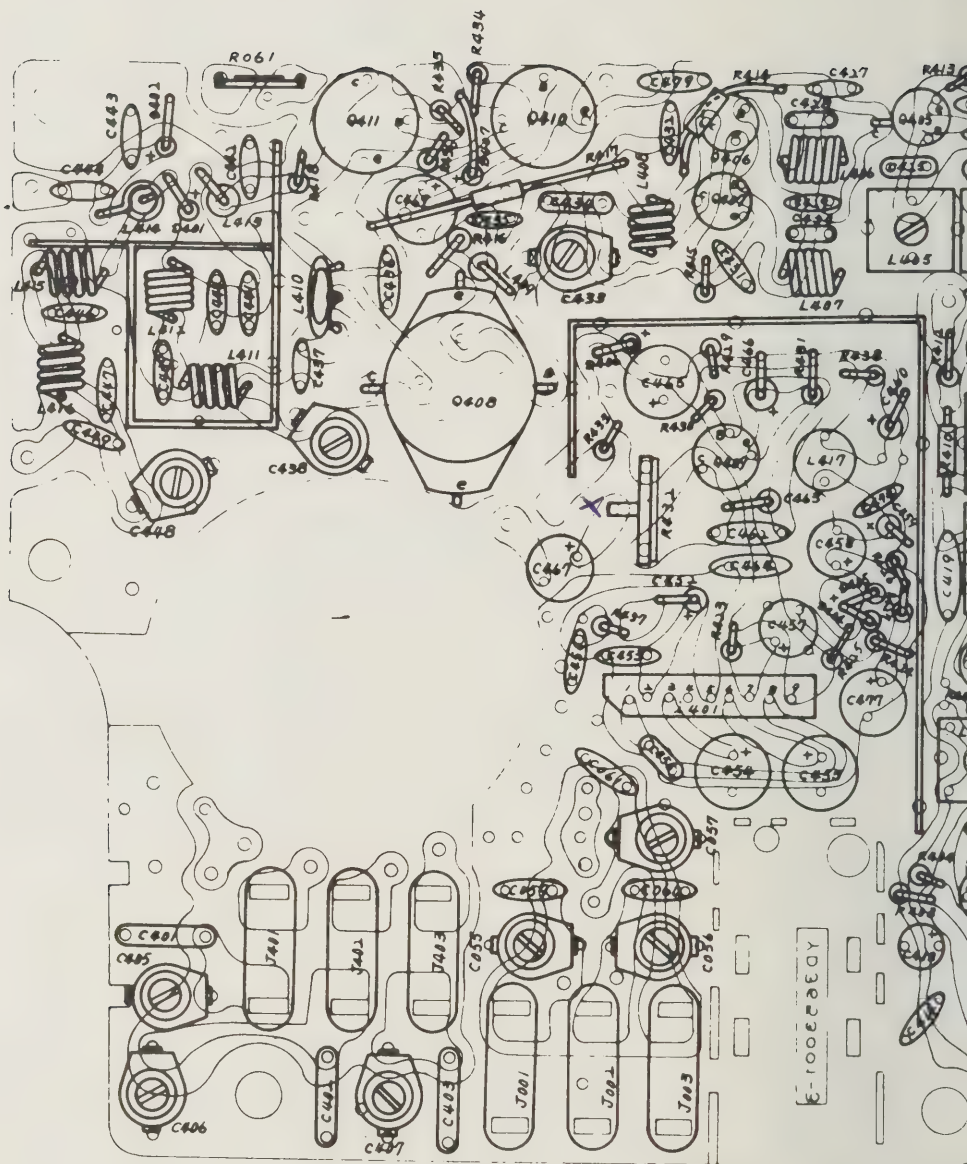
CRYSTAL NETTING

Receive crystals may be "netted" by connecting a 50-0-50 MA meter between the small green "wire test point" located near the volume control and chassis ground (frame). Refer to the Printed Circuit Board layout for details. Adjust the appropriate trimmer for "zero" reading on the meter when receiving an "on frequency" counter.

OPERATING HINTS

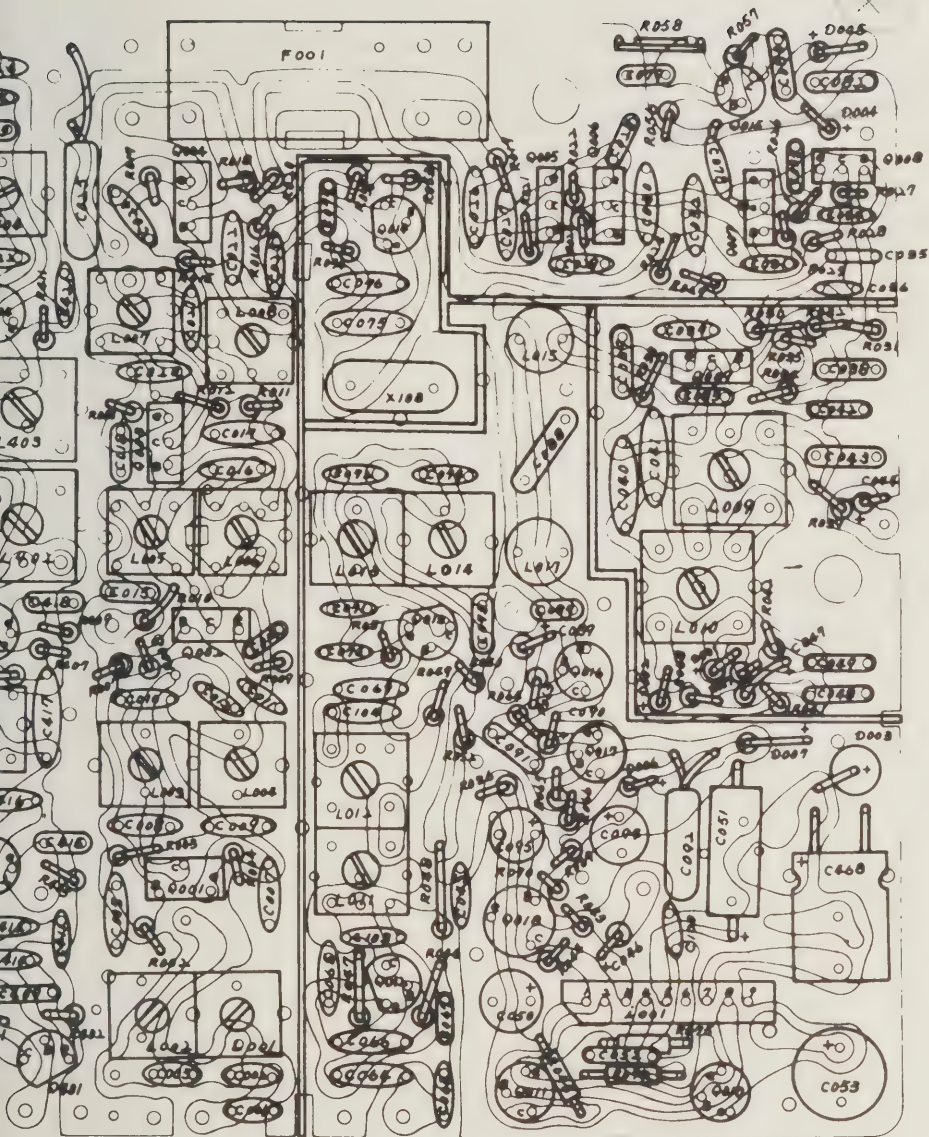
With your purchase of the all new SR-C146A two meter FM transceiver, you have just entered the fascinating world of amateur FM - the Fun Mode.

If you have not experienced FM operation before, you will encounter a unique mode of amateur radio communications. If you are familiar with H.F., SSB, or CW operation, you will have to re-orient yourself to FM.



PRINTED CIRCUIT

SR-C1462



238549202 6/72
(May vary slightly
from actual unit.)

IT BOARD

OPERATING HINTS (CONT.)

Generally, your dealer or local FM'ers will know what the popular frequencies are in your area. One of the popular national simplex frequencies is 146.940 MHz ("nine-four"), unless there is a repeater output on this frequency. The most popular national repeater channel is 146.340 transmit/146.940 receive. Both 146.94 simplex and the 34/94 repeater pair are included in your SR-C146A. Other popular repeater pairs include:

146.16 transmit/146.76 receive

146.28 transmit/146.88 receive

In addition, we recommend that you install 146.520 MHz simplex, as it is the up-and-coming alternate national calling frequency.

Then, before you go "on-the-air," LISTEN TO THE CHANNELS IN USE FIRST to determine the accepted operating procedures on the frequency or repeater you plan to use. Procedures - although very simple - vary from area to area. FM is a "break-in/break-out" operation with SHORT transmissions. Since the channels are shared by many people, this is very important. Many repeaters limit your transmission through the use of a "Time-Out" timer. These timers vary in length - generally 1 to 3 minutes.

It is not necessary, nor desirable, to call "CQ" as you would on other bands, since FM is channelized, and thus all those on a given channel are monitoring simultaneously. A simple "WA6XYZ 10-8" or "This is WA6XYZ on channel" will elicit a

OPERATING HINTS (CONT.)

response from anyone who desires to talk. Some areas use the "10" codes or "Q" signals; however, you will find that if you talk as you would in a normal conversation, you will soon adapt to the free-and-easy manner of FM - the Fun Mode.

Repeaters are sponsored by either an individual or a club. Where an individual is responsible, it is generally advisable to obtain permission before using the system. A great number of repeaters today are sponsored by radio clubs or associations. Since repeaters are costly to build and require maintenance, many clubs require membership or support for their project. Since this responsibility is spread over many users, the individual user cost is negligible. Visit your local club, and you will find those with a similar interest eager to help.

We hope that this gets you off on the right foot. If you have any questions, just drop a note to: Standard Communications Corp., Attention: Amateru Radio Division, P. O. Box 325, Wilmington, California 90744. One of our resident FM'ers will send you a personal reply.

SUGGESTED REFERENCES

73 Repeater Atlas (lists all current repeaters) -- 73 Magazine
 Radio Amateur FM Handbook ----- Ken Sessions, Jr.
 How to Use FM ----- 73 Magazine
 We suggest you read Ham Radio, RPT, CQ, and 73 magazines for the latest in FM happenings.

SR-C146A ACCESORIES

CSA - Desk top charger/AC adaptor

PT3644 - Carrying Case

MP08 -Miniature remote microphone

AT-19 - Flexible rubber Antenna

CMS- Mobile Adaptor

B090300Z - AA size NI-CAD Batteries

TX1H - "Astropoint" transmit crystal

RX1H - "Astropoint" Receive crystal

NOTES

STANDARD COMMUNICATIONS CORP.
P.O. BOX 325
WILMINGTON, CALIFORNIA 90744

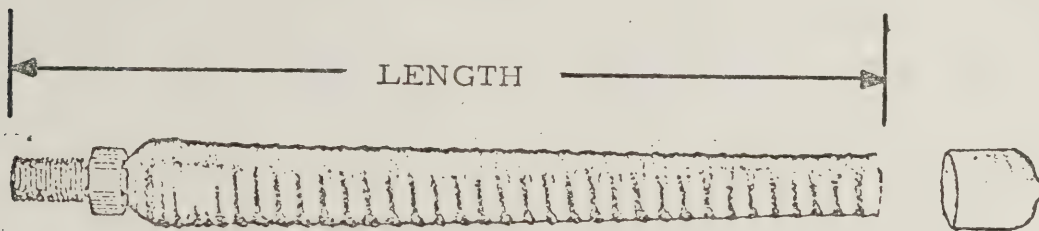
456338502
7/72

STANDARD COMMUNICATIONS CORP.

CUTTING CHART FOR SC-UAT-19 FLEXIBLE RUBBER ANTENNA

Procedure:

1. Remove the tip before cutting.
2. With the aid of diagonal pliers cut the antenna to the proper length per Figure 1.
3. Replace the tip after cutting



NOTE

Some Hand Held Transceivers may not be taped for this antenna. If necessary tap the antenna receptacle for 5/16 x 32 thread. Both the telescoping metric threaded antenna and the AT-19 antenna can now be used.

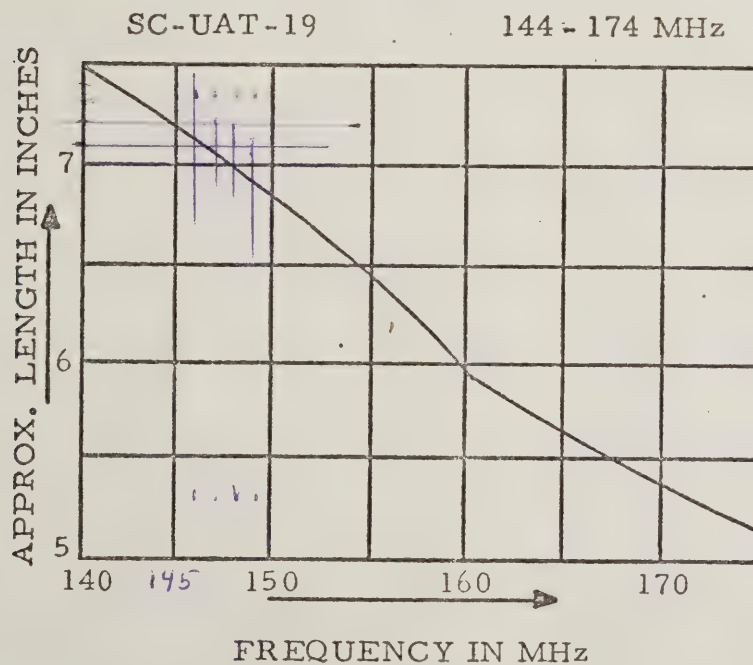
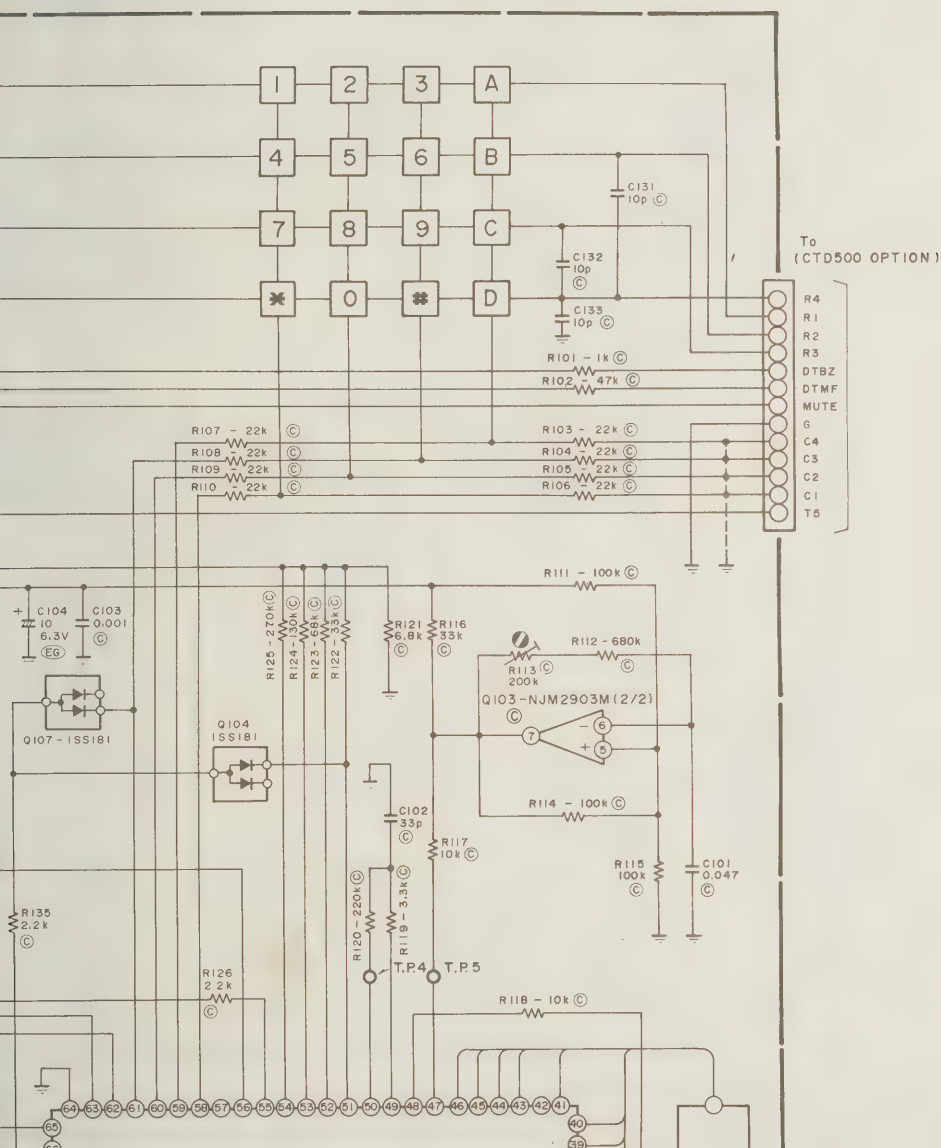


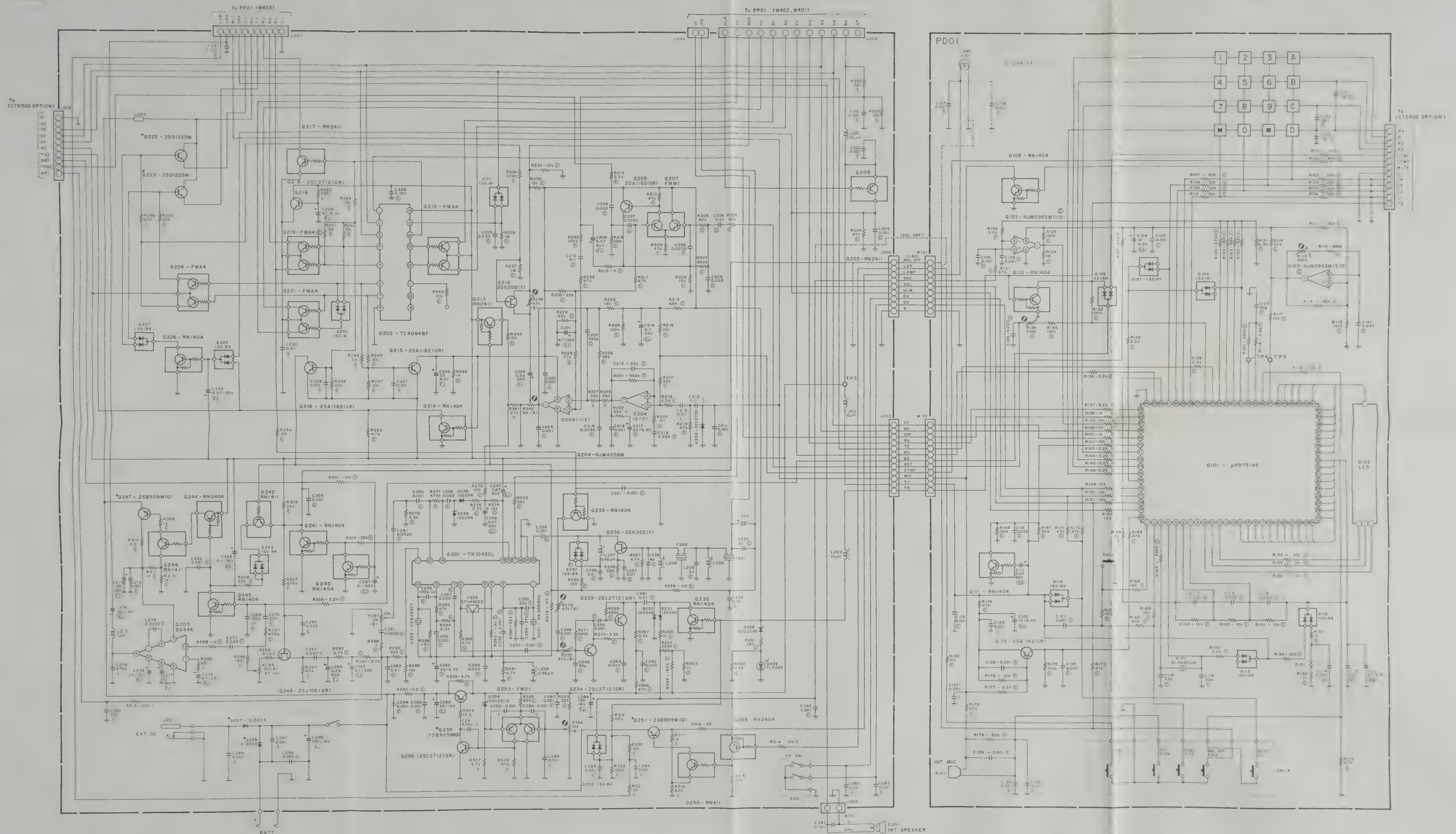
Figure 1.

Standard

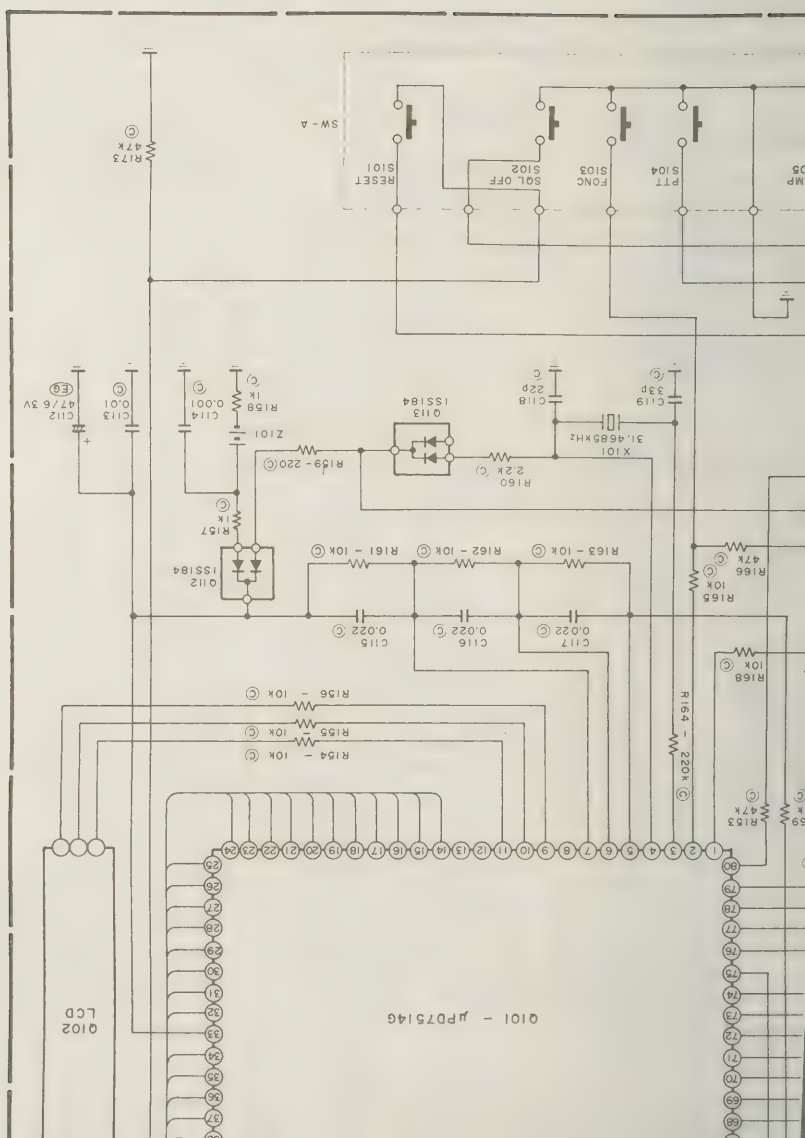
DIAGRAM FOR MODEL C500



Standard



本機は回路は改良のため予告なく変更することがあります。ご了承ください。



SCC SERVICE GUIDE

IN WARRANTY SERVICE

Your SCC equipment is covered by the SCC Limited Factory Warranty Service Program for a hundred and eighty (180) day period, beginning on the purchase date. The SCC Warranty Registration Card must be returned within twenty (20) days of purchase date to obtain the full hundred and eighty (180) day warranty on this equipment. If the Warranty Registration Card is not received by SCC, the stated warranty period will retroactively begin on the date of original shipment of the equipment, from the SCC factory to your dealer.

To obtain factory warranty service, return the SCC Customer Equipment Warranty Identification and Service Request Card along with the defective equipment (freight prepaid) directly to the SCC Factory Service Center. The Factory Service Center will make the necessary warranted repairs and return your equipment (freight prepaid) by surface transportation.

EARLY FAILURE/REPEAT REPAIR POLICY

Your equipment will receive top priority service in the event it fails within two weeks of purchase date, or has been returned two or more times for repetitious failures. SCC will at its option, repair your radio unit or exchange it with an identical new unit. In either event, the repair or replacement will be performed on an expedited basis and your equipment will be returned (transportation prepaid) by the fastest available transportation.

EQUIPMENT TRANSPORT

It is the customer's obligation, when returning faulty equipment, to properly pack the SCC equipment in its original packaging. Failure to do so may inadequately protect the equipment in transit and, therefore, jeopardize the customer's SCC warranty. The defective SCC equipment should be sent, **FREIGHT PREPAID:**

BY U.S. MAIL:

SCC FACTORY SERVICE CENTER
P.O. Box 92151
Los Angeles, CA 90009

BY COMMON CARRIER:

SCC FACTORY SERVICE CENTER
108 W. Victoria Street
Carson, CA 90246

Please be certain your equipment is defective prior to returning it for service. You will be charged a \$5.00 handling and shipping fee if your equipment, upon being tested, is found to be in good working condition and meets original factory specifications. Under normal circumstances, the total time required for factory service will be approximately thirty days. Since a significant portion of the total repair time is consumed in transporting your equipment to and from the factory, you may desire faster return transportation. You may obtain expedited return service by sending \$3.00 in check or money order with your equipment. If this service is desired, please check the "\$3.00 Expedited Return Fee" box on the front of the SCC Equipment Warranty Identification and Service Request Card. If expedited return is not requested, your equipment will be returned, freight prepaid, by surface transportation.

WARRANTY/REPAIR SERVICE FOLLOW-UP

CALL
CUSTOMER SERVICE
(213) 532-5300, X244

TIME(PST)
8:30 to 11:45 A.M.
1:45 to 4:45 P.M.

OUT OF WARRANTY SERVICE PROGRAMS

SCC provides two different repair service programs, **FLAT RATE** and **TIME AND MATERIAL**. The **FLAT RATE SERVICE** reconditions the equipment to its original factory specifications and also extends the Limited Factory Warranty for an additional sixty (60) days. The **TIME** and **MATERIAL SERVICE** does not include a general reconditioning of your equipment. It is, instead, a program designed to service only those items specified by you. If you desire only a specific component repaired or modification performed on your radio, you should request **TIME** and **MATERIAL SERVICE**. This service extends your Limited Factory Warranty for an additional sixty (60) days on those parts which are replaced. If you return your equipment for service and later elect not to have it repaired you will be charged a \$5.00 freight and handling charge.

TIME AND MATERIAL SERVICE PROGRAM

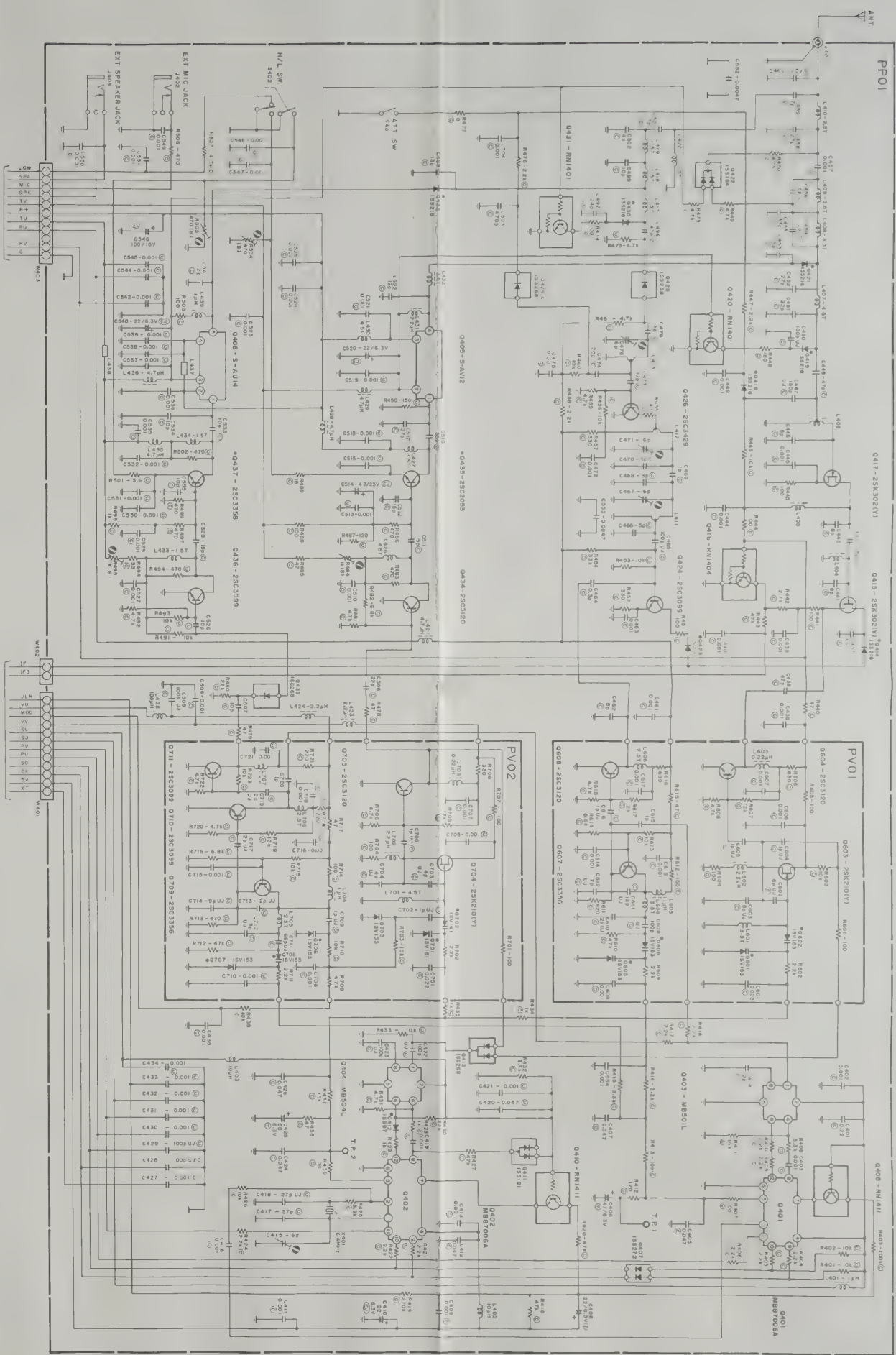
The Time and Material Service Program should be requested by you if you wish us to modify your equipment, repair only those parts of your equipment specified by you, or repair only those parts of the radio which require servicing without completely reconditioning the entire item. If you request, your equipment will be serviced to your specifications unless our service technicians detect that additional work is required. This type of servicing will be performed and charged on a time-and-material basis. To obtain this type of service, return your equipment, freight prepaid, to the SCC Factory Service Center. You will be notified of the estimated total charges (including freight and handling) and will be requested to send a check or money order, in advance of our return delivery to you. This type of service extends your Limited Factory Warranty for an additional sixty (60) days on all replaced parts only.

FLAT RATE EXTENDED WARRANTY SERVICE PROGRAM

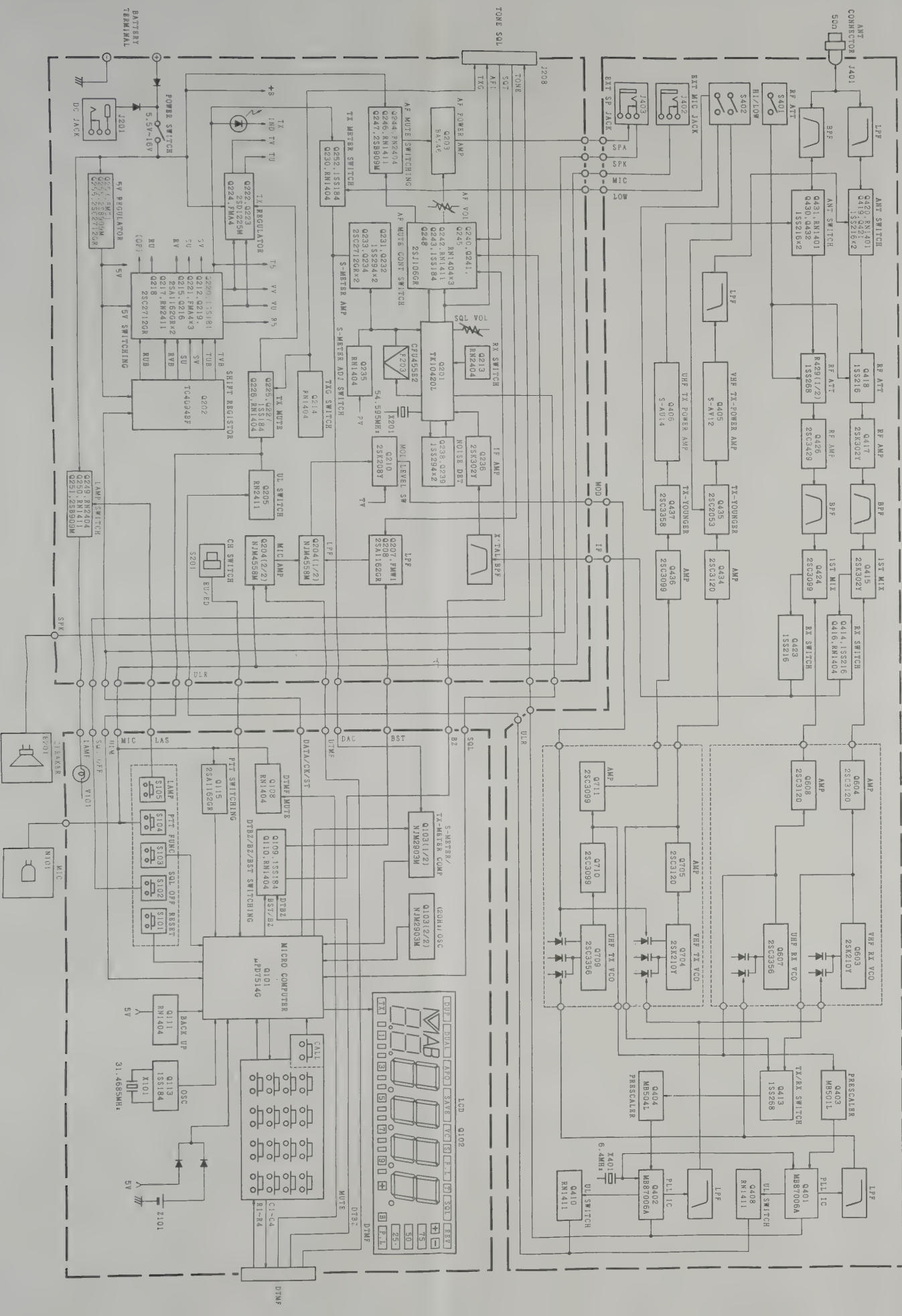
For service of equipment no longer under warranty, SCC offers a Flat Rate Extended Factory Service Plan. To obtain this service, return the unit, freight prepaid, to the SCC Factory Service Center. Your equipment will be repaired by our SCC technicians at the established rate. You will be required to pay the Flat Rate Service charge in advance of our return delivery to you. The SCC Factory Service Center will make the necessary repairs and return your unit, freight prepaid, by surface transportation. On equipment containing defective accessories, and additional Flat Rate Service charge will be applied. The Flat Rate Service includes a complete reconditioning of your equipment to its original factory specifications and also extends your Limited Factory Warranty for an additional sixty (60) days.

SUPPLEMENTAL WARRANTY SERVICE

If you find our Limited Factory Warranty Service incomplete, your SCC Dealer may provide your Supplemental Warranty Service tailored to your specific needs. Ask your SCC Dealer for more information about this type of service. This service is strictly an arrangement between your SCC Dealer and you. SCC assumes no liability for any supplemental warranty coverage on SCC equipment.



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Standard Communications Corp.

CARSON, CALIFORNIA

LIMITED WARRANTY

STANDARD COMMUNICATIONS CORP. (SCC) warrants each new radio product manufactured and/or supplied by it to be free from defects in material or workmanship under conditions of normal use and service for the period designated on the warranty card furnished with each unit, beginning on date of purchase from an authorized SCC Dealer, but not to exceed a maximum of one (1) year as indicated by the DATE CODE on the warranty card.

The SCC obligation under this warranty is limited to repairing or replacing, at its option, the radio product or part(s) therein; which upon examination by SCC shall appear to be defective or not up to factory specifications; providing the radio product is returned (transportation prepaid) to an authorized SCC Factory Service Center.

SCC shall not be liable for any damages, consequential or otherwise, resulting from the use and operation of this radio product and makes no other warranty(s) either expressed or implied on this product, including any warranty of merchantability.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the serial number thereof has been removed, defaced, or changed, nor to accessories used therewith not of our own manufacture. SCC reserves the right to make changes or improvements in its products, during subsequent production, without incurring the obligation to install such changes or improvements on previously manufactured equipment.

To place this warranty into effect, the enclosed WARRANTY REGISTRATION CARD must be returned to the STANDARD COMMUNICATIONS CORP. (SCC) within twenty (20) days after date of radio purchase. In addition, the WARRANTY IDENTIFICATION AND SERVICE CARD must be completed and returned with the failed unit when warranty service is required.

CUSTOMER RECORD

Purchase Date (Warranty Effectivity Date) _____

Purchase From _____

Equipment Model No. _____

Equipment Serial No. _____

COMMUNICATIONS ELECTRONICS SPECIALTIES INC.

Instructions for installation of Model 220 on Standard
hand held radios

1. Remove the three screws securing the back of the radio and remove the back.
2. Remove the private channel connector from it's retaining clip.
3. Remove the two screws securing the clip and remove the clip.
4. Position the private channel connector down and to the left of it's original position.
5. The tone deviation adjustment is located on the back of the keyboard, this will have to be adjusted before installing the back on the radio. Refer to the assembly drawing. The tone balance adjustment also located on the back of the keyboard has been adjusted at the factory.

